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A REPORT ON
THE MANAGEMENT OF COLLECTIONS
IN THE MUSEUMS
OF THE SMITHSONIAN INSTITUTION,

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Smithsonian Institution
Washington, D.C.
September 26, 1977

Introduction

Collecting and preserving are fundamental and indivisible aspects of a museum's function. They are the cornerstones of a museum's contributions to scholarship and the measure of its success in enriching the educational opportunities for this and future generations.

For 130 years the collections of the Smithsonian Institution have grown in variety, complexity and richness. Today they stand unmatched by any other organization or group of organizations under any one central management. They are more than a national resource; they constitute a treasure of learning and enjoyment held in trust for future generations. The importance of the Institution's collections is matched by the burden and responsibility of housing them adequately so that they can be enjoyed and studied and can fulfill their potential of contributing to the "increase and diffusion of knowledge among men."

The Institution has now come to a critical point in the development of its research and conservation programs. The facilities available to carry them out in an effective and responsible way are no longer adequate and new approaches must be sought so that curation, study and conservation may be undertaken in a proper environment. The solution found after many years of research, and the exploration of many alternatives, is the proposed Museum Support Center to be located in Silver Hill, Maryland; a facility which will be new and innovating and one which, in its presently proposed configuration, will cost twenty-one and a half million dollars.

When confronted with such an expenditure, it was only natural for the Office of Management and Budget to inquire from the Institution concerning the reasons leading to the recommendations for this new facility, and to invite the Institution to demonstrate that collection and administrative controls are in effect to assure that future growth results from a thoughtful scholarly process. OMB's request could not have come at a more propitious time for it coincided with the strongly felt need within the Institution's administration for a better assessment of present procedures and for developing new ones more responsive to needs which were becoming progressively more obvious.

The study presented here summarizes information obtained by a committee chaired by Mr. Philip Leslie, Registrar of the Institution. It is as exhaustive and candid as the time available for its completion allowed. It presents a diverse panorama of policies, directions and traditions, arrived at by different means and carried out with various degrees of control. It suggests a number of areas where policies might be consolidated or where more detailed study is required.

The growth curves projected for the future are the products of statistical analyses and have been modified where appropriate by critical curatorial and directorial review based upon the knowledge of the estimated object universe in the various disciplines as well as on an assessment of new directions that collecting may -- and in some cases must -- take because of the shrinkage of resources, ecological and evolutionary change, as well as the impact of new ways to communicate and share these resources among institutions.

This study, which brings together much new information for the first time and presents old data in a fresh context, will continue beyond this present stage. It will lead to further refinement in practices, to the codification, wherever appropriate, of procedures, and to the identification of new collecting needs.

While assembling this data, a soul-searching examination has been initiated which will unquestionably lead to improved methods for administering and further developing these unparalleled collections for the benefit of contemporary society and of future generations of visitors and scholars. In the meantime there are a number of recommendations that immediately commend themselves to our attention and which will provide information needed for future planning. They are listed on page 131.

Paul N. Perrot
Assistant Secretary
for Museum Programs

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I. THE COLLECTIONS POLICY AND MANAGEMENT (CPM) STUDY

The dilemma caused by growing collections and the increasingly inadequate facilities to house them became an important concern of the Smithsonian Institution more than ten years ago. Since then, a number of proposals and studies have been made in an effort to seek a solution to a situation which, with every passing year, was becoming more critical. These studies were concerned with defining the scope of needed physical facilities as well as assessing the requirements of various types of collections and defining research, curatorial, and conservation relationships.

It was apparent, from the onset, that existing and new facilities on the Mall should be devoted primarily to public service through exhibition and education programs designed to present to the millions of visitors who come to the Capital every year the most comprehensive panorama possible on the development of the natural and manmade world. As a consequence, any new storage, research, and conservation facility would have to be removed from the Mall, though in a location easily accessible to the staff as well as to the smaller constituency of visiting scholars.

Between the late 1960's and the mid 1970's the acute need for a new facility came into sharper focus. As its scope was defined and the financial requirements to meet the most urgent need were determined, another need became apparent to the Institution and to the Office of Management and Budget: an examination of collecting goals and acquisitions policies and of the various

administrative procedures enacted by the Institution's several museums to keep policies current and to ascertain that each step in the acquisition process was accompanied by appropriate curatorial, departmental, and directorial review in accordance with the recognized mandate of each of the units involved. This critical self-appraisal of practices was a logical precondition to the allocation of new resources for further expansion.

In the Spring of 1976, Secretary Ripley appointed a committee under the Chairmanship of Philip Leslie, Registrar of the Institution, to carry out a Collections Policy and Management Study. Members of the Committee included:

Frederick Bayer, NMNH
Douglas Evelyn, NPG
Robert Farrell, Agenda Office
Bernard Finn, NMHT
John Jameson, Administration
Nancy Kirkpatrick, Programming and Budget
Edward Kohn, NZP
Stanley Kovy, Computer Services
Thomas Lawton, Freer
Philip Leslie, SI Registrar's Office
Donald Lopez, NASM
Harry Lowe, NCFA
Marie Malaro, General Counsel's Office
Christian Rohlfing, Cooper-Hewitt
Frank Taylor, Administration
Stephen Weil, HMSG

These were assisted by Lee Ann Hayek, Office of Computer Services who performed statistical analyses of collection growth; Kenneth J. McCormick of the Office of Computer Services who provided programming support; and Margaret Hardin of the Anthropology Department of the University of Maine (temporarily employed at NMNH) who correlated the selection and disposition study whose conclusions appear in Appendix C. Among others, whose help is gratefully acknowledged, are Stephen A. Boruchowitz, Mary W. Lund and Melva L. Simmons of

the SI Registrar's Office, who provided data and editorial support, and Paula Degen, of Degen Associates Interpretive Services, who edited the preliminary draft.

SCOPE OF THE STUDY

The average person tends to think of the Smithsonian Institution as either a museum or a group of museums. It would be more accurate, however, to describe it as a centrally administered complex of separate bureaus, each engaged in one or more of four basic activities: research, publication, collections management, and exhibition.

Collections management encompasses all the functions necessary to the development and perpetuation of collections containing art works, artifacts, scientific specimens, and other objects representative of our cultural and natural heritages. It is a term commonly used both in museums and in collection-maintaining organizations other than museums. A listing of collections management responsibilities includes such things as selection, classification, cataloging, conservation, information and records management, insurance, packing, security, storage and transportation, and space planning.

Although in studying the collection management practices and policies of the Institution an examination was made of all its parts, the principal investigation focused on the nine bureaus whose operations require that they

manage collections which in their aggregate cover virtually every aspect of manmade and natural creation. These nine are:

- o Cooper-Hewitt Museum of Decorative Arts and Design
- o Freer Gallery of Art
- o Hirshhorn Museum and Sculpture Garden (HMSG)
- o National Air and Space Museum (NASM)
- o National Collection of Fine Arts (NCFA)
- o National Museum of History and Technology (NMHT)
- o National Museum of Natural History (NMNH)
- o National Portrait Gallery (NPG)
- o National Zoological Park (NZIP)

II. PURPOSES AND USES OF COLLECTIONS

The disposition of the moonrock samples gathered during the Apollo missions illustrates the purposes and uses of museum collections in general. These rocks, representing American achievement in space, are regarded as the shared property of all mankind and rightfully should be made perpetually available to all. Therefore, NASA has dispersed the samples to locations where they can be viewed and studied by as many people as possible. Some of the rocks are on public display in selected museums and NASA Centers. Some are being moved about the world in traveling exhibitions. Some representative samples have been and will be subjected to both destructive and nondestructive analytical testing to further refine our understanding of them. About one-fourth of the existing samples are being stored in a stable, secure environment, remotely located to assure their integrity and availability to future generations of scientists who may need to examine them anew or employ analytical techniques not yet developed.

In every case, the lunar rock samples are maintained in organized collections, for it is in the collecting community, primarily, that one finds experts in the preservation and storage of precious objects. The lunar rocks have some special requirements which these experts are best able to satisfy. For example, with the exception of such specimens as the polished slice that visitors can touch at NASM, lunar material should be stored in an inert environment even when on display. All the lunar rocks should be protected from theft, from careless handling, and from inadvertent contamination or destruction. Yet they must be stored in such a way that specimens can be retrieved when needed.

Because of the dramatic circumstances under which these specimens were collected from their extraterrestrial source, the world knows about them, is interested in seeing them, and appreciates the need for a management program to maintain them. Yet, other objects and specimens in museums have the same characteristics. Art objects, artifacts, and scientific specimens are collected for similar purposes and potential uses, and they have similar requirements for preservation, storage, documentation, and access.

WHY MUSEUMS COLLECT

In the hope of attaining a better understanding of the present and gaining insight into the future, it is important to know and understand the past. Artifacts and scientific specimens provide an objective basis for our knowledge of the earth and other bodies in the solar system, the origin and development of life on earth, and the achievements and aspirations of mankind. Some museums attempt to select, secure, and preserve as unbiased, complete and representative collections of samples as possible. Those samples are themselves repositories and records of artistic, cultural, technical, and scientific endeavors and achievements of the past and the present, for use by this and future generations. The objective of such collecting is to bring together a sufficient number of items and enough documentation and other supporting written information to allow significant comparisons in order to formulate questions and seek answers concerning ourselves and the natural and manmade environment. While the questions that are asked are influenced by such factors as cultural and other

biases and by the limits of present understanding, the material object offers the soundest foundation on which to base our knowledge. The three-dimensional object represents something tangible on which hypotheses can be based and interpretations made. As long as the object or specimen remains it can be referred to and reexamined with new insights, new questions, and new bases for further investigation.

Among other museums, those concerned with art may have a different goal: to present only the high points of one or another aspect of art history and provide the opportunity for the unique intellectual delight of viewing objects chosen with care and presented in such manner that the individual observer is engaged in a personal voyage of discovery into the subtleties of artistic creation. These several types of museums, whether concerned with science, history or art, are complementary. Together they serve the highest scholarly aims and provide unmatched opportunities for learning, enjoyment, and inspiration.

Many of the objects and specimens important for present and future study are fragile, and all are subject to the deterioration that is the fate of all matter. Unless there is a deliberate attempt to preserve them, irreparable alteration, disruption, or actual destruction will remove them from the record. Environmental hazards, ignorance, and inherent weaknesses work to obliterate the physical remains of the past. Contributing to this obliteration is man's increasing mobility and the pace of change which hastens the rate at which objects and specimens are discarded, or drastically altered.

Through the years, museums have had a major role in rescuing and preserving the material evidence of the past and of the present before it was lost. Even

though it is not always possible to identify endangered objects before they have disappeared, a conscientious effort must be made to secure and preserve those that might hold clues for future knowledge and enlightenment. Whether fossils and artifacts rescued from a construction site, aircraft and other objects that tend to be destroyed through their use, or paintings, textiles, and other materials that naturally deteriorate, the object or scientific specimen can best be saved, preserved, and made accessible as part of a museum collection.

Man-made objects and natural specimens provide the most reliable evidence of what was and is. Preserved with integrity, they provide evidence on our predecessors, put our own history in perspective, and have the potential to communicate with and enrich future generations. Most studies that deal with the physical world depend upon these objects for the information they contain; museums collect and preserve them for research, education, exhibition and, most importantly, because they are the authentic record of human creativity, and of the evolution of nature.

USES OF SI COLLECTIONS

The collections at the Smithsonian Institution are primarily used for research and archival purposes, for education, and for exhibition. Those who use the collections represent a cross section of society: the general public; elementary, high school, college, and graduate students; collectors and hobbyists; scientists and scholars; craftsmen and industrialists; public servants and foreign visitors of all kinds.

Research has been an essential function of the Smithsonian since its inception. Within the Institution research on collections is conducted primarily by SI staff and other qualified scholars. The documentation and other products of this research together with the objects themselves contribute to man's knowledge, and become part of the archival record that will be studied and evaluated by future generations.

NMNH, for example, is one of the major centers in the world for basic research in the natural sciences. The scientific staff works with the museum's collections in ways that vary from routine identifications to in-depth original research. This research leads to numerous applications. For instance, scientists and scholars from industry make use of NMNH's systematic collections in such areas as environmental impact studies. NMNH collections have also been employed by industry personnel in the search for fossil fuels. Similarly, other bureaus make their collections available for research. At HMSG, the paintings storeroom is also a study area which allows the serious researcher access to those parts of the paintings collection which are not currently on public display. Staff research at NASM has lead to an important publication on lunar geology. Scientists from NASA and other agencies refer to these collections. And, for the serious hobbyist, NASM's collections provide technological guidance, as for example in the construction of full sized and model aircraft.

Research is a basic prerequisite to the educational uses of the collections. Research and education are inseparable. Students working toward advanced degrees may use the study collections in any of the several Smithsonian museums. In NMNH their thesis research may be directed by museum staff members who serve

as adjunct faculty at various universities. Students working under these staff members may also receive practical training in museological techniques and learn research and field methods through hands-on practice. At the Freer, graduate students from the University of Michigan, recipients of Freer Fellowships, are able to spend a year preparing their dissertations based on objects in that museum's collection. Another example of museum/student alliance occurred with HMSG's recently opened exhibit of the works of Thomas Eakins. Supervised by the museum's curatorial staff, graduate students in American art history at the University of Delaware conducted research for the published catalogue that accompanied the exhibit.

Education at the primary, secondary, and undergraduate levels is enriched by visits to the exhibits and examination of selected objects or specimens in the collections of the various museums of the Institution. These exhibits are usually interpreted by their labels which can be elaborated upon further by school staff or the museum's education department. Guided tours, audiovisual and written materials, lectures and other special programs are also provided by the museums as an integral part of their educational offerings. Further, almost all Smithsonian museums have vigorous loan programs. NASM loans large numbers of aircraft and spacecraft to other museums. NMNH loans specimens to other museums and to universities for study and interpretation by students and faculty. Special traveling exhibitions containing objects from the collections and benefiting from staff expertise are circulated throughout the United States by the Smithsonian Institution Traveling Exhibition Service.

The general public has its main contact with the museum collections through the various exhibition programs. Exhibits are backed by solid research

and are presented so as to enhance education and enjoyment. Materials from the collections selected for exhibition represent either outstanding or typical examples of some aspect of scientific or cultural development. Their presentation is designed in order to provide information or insights that might not be obvious from the object or specimen alone. In most cases only a small portion of each collection is exhibited at any one time, the remainder being maintained for use in future exhibitions or for the archival or research uses discussed above.

Museums provide the mechanism for selecting and gathering together the objects and specimens that record our past and present. They provide the means to maintain and preserve this record while using the collections for research, education, and exhibition. The objects and specimens in the collections of the Smithsonian Institution are made available in as many ways and to as varied a public as is consistent with protecting them, and the record they include, for the benefit of future generations.

III. SELECTION, ACQUISITION AND DISPOSITION PRACTICES

The formal process by which an object or specimen is entered officially into a museum collection is commonly known as accessioning. The accessioning of an item results from the carefully arrived at decision that the item is of museum quality and that the Institution will preserve it and make it available for study, research and display. Accessioning is generally intended to be a final action. However deaccessioning is provided for in the Institution's documentation procedures. It is customarily exercised only after the most carefully scrutiny and only if unusual circumstances are present. Hence it is limited to a relatively small number of cases.

Since accessioning is meant to be a permanent step, it is important that questionable, inappropriate or otherwise unwanted items be filtered out in advance. Accessioning is therefore the last step in the acquisition process and is preceded by rigorous curatorial and administrative evaluation of each item against such criteria as:

- o Scholarly importance, scientific, historical or aesthetic
significance
- o Quality
- o Condition
- o Preservability
- o Appropriateness to the collections
- o Need for such an object or specimen in a
particular collection

- o Provenance*
- o Offerer's legal title and right to convey either
by gift or purchase
- o Possibility that the item may be stolen cultural
property or property illegally exported from
a foreign country
- o Cost of acquisition (purchase price and/or transportation
costs) and availability of funds
- o Space available to accommodate it

SELECTION METHODS

In several respects the methods used by a museum curator to find suitable objects or specimens for acquisition are similar to those used by a publisher to find suitable manuscripts. Each has certain definite requirements and criteria which require close examination of the available items. Each is apt to receive many unsolicited offers yet neither can afford to disregard any offer without careful investigation and inquiry for fear of missing an extraordinary opportunity.

* Museum practice goes considerably beyond the standard dictionary definition of provenance as the source or origin of something. Provenance information usually amounts to a brief history of an object or specimen. For a work of art or an artifact it will include such things as: when, where and by whom it was created; who the previous owners were; and why the object is significant. For a scientific specimen it will include complete details on when, where, how and by whom it was collected.

Because a great many persons are anxious to give or sell things to museums, a substantial share of a curator's time must be devoted to evaluating (and usually declining) unsolicited offers. This is especially true at the Smithsonian because it is such a well-known national repository and because people take special pride in making contributions to it. The Institution not only receives offers addressed directly to specific departments but also many general letters, phone calls and visitor inquiries from people who have things to offer. These inquiries are handled by a corps of volunteers who operate information desks and provide referral services for mail inquiries and telephone calls. These trained volunteers, who number over 400, refer such inquiries to the most appropriate curators.

Smithsonian curators not only evaluate these unsolicited offers but also exercise initiative and take positive actions to search out things needed to fill gaps in their collections and to identify classes of materials whose preservation warrants serious consideration. For instance, those who manage collections containing works of art or other objects available through commercial channels peruse dealer catalogs, advertisements and similar sources of information. Since acquisition funds are limited, purchasing is resorted to only when exceptional items are available and no donor can be found.

In the case of a scientific collection, adequate information on where, how and when a scientific specimen was collected can be as important as the specimen itself. For this reason a specimen offered by a dealer or an amateur collector may be of little value to a curatorial scientist even though it is in perfect condition. While some specimens are obtained from commercial and amateur sources, most of the material for Smithsonian scientific collections

is obtained in other ways. Occasionally, for instance, a well-documented private collection, assembled by a scientist of known reputation, will become available as a gift or bequest and will be accepted intact. However, most scientific specimens are collected in the field by staff scientists and brought back with supporting field documentation, for subsequent evaluation. Whether collections are the result of field activity or of donations, they are subjected to curatorial evaluation against the criteria listed above. Individual specimens selected for accessioning are processed into the collections according to established procedures and the remainders are disposed of as described later in this chapter.

ACCESSIONING

When an item has satisfied the criteria and been approved for accessioning it is registered officially in the office of the museum's registrar.* At this time all documents pertinent to the item's origin and ownership, the museum's title to it, etc., are forwarded to the registrar's office for the creation of a dossier (commonly referred to as an accession file). Both the item and its file are henceforth identified by a unique number (accession number) assigned by the registrar. The process of assigning the number and the creation of the dossier is referred to as accessioning.

* Each Smithsonian museum has its own registrar. Coordination is provided by a central registrar through an organization designated as the Registrarial Council. Additional information about registrarial activities and responsibilities can be found in Appendix D on information management.

The accession files are maintained by the registrar as archival records and are the official inventory records for every item in the museum's collection. Once an item has been accessioned, a written record must be placed in its accession file every time it is moved to a new location, loaned, placed on exhibit, conserved or otherwise subjected to a change. If the item is ever officially withdrawn from the collection, a record of that action stating the date of and reasons for the withdrawal is placed in its accession file. The entry of such a record is what is referred to as deaccessioning. (See below for a related discussion of deaccessioning.)*

DISPOSITION OF REJECTED OBJECTS AND SPECIMENS

As a rule anything delivered physically to the Smithsonian for evaluation and subsequently rejected is returned to the offerer. There are times, however, when other disposal alternatives are selected. For instance, occasionally the donor of a small collection will decline a museum's counter-offer to return the unwanted items and will agree in writing to permit the museum to dispose of them as it sees fit. In other cases, such as when unwanted specimens are culled from the proceeds of a scientific expedition, there may be no offerer to return them to.

* The foregoing explanation refers only to the normal practice of assigning a distinct accession number to each individual object or specimen. Occasionally a closely related group of items, particularly scientific specimens, will be accessioned together as a set and assigned a common accession number. If, for instance, 103 specimens are accessioned together they constitute one accession but 103 accessioned specimens.

Sometimes the museum can hold such items temporarily and exchange them, with collectors or with other museums, for things the museum does want. For instance, NASM is now holding several aircraft engines which are of museum quality but which are duplicates of others already in the accessioned collection. Since the donors have given permission, NASM will eventually arrange for appropriate exchanges. When a Smithsonian museum makes such exchanges it is customary to credit the donor of the original item with the donation of the item for which it was exchanged.

In three of the Smithsonian's museums, items inappropriate for regular accessioning and not returnable to donors are placed in comparatively small ancillary collections called study collections. The term study collection has varying meanings in Smithsonian museums. In seven of the nine bureaus (including Cooper-Hewitt) the term study collection, or the term research collection, is commonly applied to the behind-the-scenes portion of a regular accessioned collection, i.e., to that portion of the collection which is not on exhibit.

The Freer, for instance, maintains a study collection of approximately 5,000 items consisting of ceramic shards from known sites, fragments of ceremonial bronzes, woodblock prints, etc. Each object in the Freer study collection is assigned a unique number different from the regular Freer accession number.

The NPC, whose primary objective is to collect portraits from life in various media of people who have achieved national prominence, maintains a study collection of works of two types: portraits not painted from life and portraits of promising people who have not yet achieved national prominence.

Each portrait is assigned a collection number with the prefix S (study) to distinguish it from a portrait in the regular collection. If any of the subjects do achieve national prominence their life portraits are removed from the study collection and accessioned into the regular collection.

Cooper-Hewitt maintains an ancillary collection that is sometimes referred to as its study collection and sometimes as its use collection. Individual numbers are not assigned to the items in this collection but records are kept of them. It contains prints, samples and other items not of museum quality but nevertheless useful as representative examples of design or decorative arts. Unlike the Freer and NPG collections, which are intended for use by advanced scholars, the Cooper-Hewitt collection is organized primarily for use by students and design practitioners.

Still another kind of collection is found at NMNH where several departments maintain what they call school collections. A school collection consists of specimens that are not needed for any regular collection but are otherwise sound representative examples. Typically a department will have a few storage cabinets containing such specimens and will make them available to schools, colleges and universities. Specimens are issued to a school on indefinite loan. When returned they go back into the department's school collection for subsequent loan to other educational institutions. Inventory records are not usually kept for these specimens, but whenever a loan is made the material is transmitted with a Shipping Invoice which describes and enumerates the specimens.

Finally, there are instances when unwanted items can not be returned, exchanged or incorporated into study or school collections. These are situations involving objects or specimens that are damaged, unpreservable or otherwise useless. Unless they contain salvageable components of significant intrinsic value they are discarded, and the action is recorded.

STATISTICS ON REJECTIONS

Historically the Smithsonian has always maintained statistics on items accessioned into its permanent collections but it has not compiled statistical records on declined offers nor on objects and specimens rejected during pre-accessioning evaluation. No records are made of objects declined in telephone calls and conversations between curators and offerers. Although carbon copies of letters declining offers are placed routinely in departmental correspondence files, no attempt is made to separate them for statistical purposes. After objects or specimens have been evaluated, the ones selected are automatically counted at the time of accessioning but those that have been rejected ordinarily are not counted. Whether it would even be useful to compile statistics on rejections is open to question. Requiring curators to create records of all these transactions and then synthesizing the results would place an appreciable burden on them and take time that might be put to more constructive use. But the overriding reason for not doing so has been the absence of any pressing need for the information in the day-to-day management of the Institution.

A need did arise, however, during this study when it was found desirable to show, in some quantitative way, the discretion exercised by the Institution in responding to collecting opportunities. Curators who were questioned during the study generally agreed that they decline more offers than they accept. This consensus was confirmed by the previous experience of the General Counsel's Office in processing bequests and potential gifts. The Smithsonian is often named as a legatee, but each bequest processed through the General Counsel's Office is first referred for review to the appropriate curator. Similarly, prospective donors who seek guidance from the General Counsel are directed first to the curatorial staff to ascertain the desirability of the proffered items. While it is the experience of the General Counsel's Office that a high degree of selectivity is exercised by the curators with regard to both bequests and prospective gifts, few firm statistics are available.

One set of figures was offered by NMNH's Anthropology Department. That department had documented an effort to reduce certain large archeological ceramic collections to manageable sizes prior to accessioning. The data provided by the department, with the comment that no other similar effort had been made during the past ten years, contained notes on three collections as follows:

o British Guiana (Guyana)

Original quantity	-	12	quarter-units*	
Accessioned	-	7	"	
Rejected	-	5	"	42%

* A quarter-unit is a common type of storage case which holds approximately 15 cubic feet of material.

o Rio Napo (Ecuador)

Original quantity	-	16	quarter-units	
Accessioned	-	9	"	
"	-	4	large urns	
Rejected	-	9	quarter-units	43.7%

o Coastal Ecuador (Valdivia)

Original quantity	-	18	quarter-units	
Accessioned	-	8	"	
Rejected	-	10	"	55%

Another set of figures was provided by NASM's Aeronautics Department. These happened to be available because that department became interested in demonstrating the fallacy of the popular notion that the Smithsonian will accept anything offered to it. During a six-month period in 1976-77, records were kept of what was rejected and why. The records show the following:

<u>Objects</u>	<u>Offered</u>	<u>Declined</u>	<u>Percentage</u>
Aircraft	19	16	84%
Engines	26	23	88%
Models	91	80	88%
Propellers	17	16	94%

During the same period the department also declined a set of aircraft wings, an unspecified number of weapons and a painting of a minor figure in aircraft history as well as seven batches of flight clothing, uniforms, insignia and miscellaneous flight memorabilia.

The records kept on this project give the reasons for rejection in each case and amplify the selection criteria listed on pages 13-14. Following are some representative comments:

- o Really a reproduction and does not belong at NASM
- o Already have one in the collection
- o Not historically significant
- o No requirement
- o No great significance; difficult to store and display
- o Too large to exhibit; not of practical importance
- o Would-be donor made stipulation that it must be on permanent exhibit
- o Can be recorded for history by documentation
- o Not of sufficient historical or technical interest
- o We do not collect this type of unit insignia. Collected by Air Force Museum
- o Size and weight make it too impractical to store and handle

SELECTION AND DISPOSITION STUDIES

In an effort to develop additional information on selection and disposition processes the CPM committee arranged with NMNH for several special studies based on collections at hand, some accessioned, some not. NMNH was selected because its scientific specimens are often collected for their inherent character-

istics rather than for cultural or historic reasons. (Unlike a valuable painting or the former possession of an important person, for instance, an unwanted scientific specimen can be disposed of through exchange or be discarded, if the case warrants.)

NMNH selected the Department of Anthropology for these studies because its activities are fairly representative of the processes and controls in effect in other NMNH departments. Anthropology, which recently established an Anthropology Collections Advisory Committee, investigated the matter in several ways.

One study involved interviewing curators to obtain estimates of how much they accepted as potential accessions from offers or incoming groups of specimens. These estimates show acceptance rates ranging from 10% to 30% (average 25%) with concomitant rejection rates of 70% to 90%. The next level of review, the Collections Advisory Committee, approved an estimated average of 85% of curatorially-recommended specimens, thereby reducing the net estimate of acceptance to 21% of the original body of material.

An ethnographic collection of 577 donated non-accessioned items was evaluated with the following results: 65% of the specimens were accepted for accessioning by the Department of Anthropology; 31% were placed in the Department's school collection; 3% were transferred to other SI collections for accessioning; and 1% were given to the Conservation Laboratory as a source of materials to be used in restoring other specimens.

A case study was made of material recently excavated at and brought back from the Jones-Miller Site in northeastern Colorado, the location of a Paleo-Indian bison kill which occurred 7,000 to 10,000 years ago. Although this culling project has not yet been completed, enough work has been done to predict that approximately 40% of the material brought back will be discarded.

Pilot inventories of a variety of accessioned collections were conducted and the conclusion reached that less than 1% of the items examined during the process warranted deaccessioning and disposal.

These statistics are presented here because they relate to the present discussion of acceptance rates. A fuller report on the studies appears in Appendix C. The overall objective of these studies was to provide, in case-study form, an explanation of some of the processes involved in managing collections.

BEQUESTS ACCEPTED AND DECLINED

The General Counsel's Office reviewed recent files on bequests seeking instances where a multitude of items were left to the Institution by a donor. The following are examples of the disposition of such bequests.

Example A was a bequest of 143 items. Curators having interest in the items were contacted. Out of 143 items, only 24 were accepted for the collections.

Example B was a bequest of memorabilia which occupied some 15,000 cubic feet of storage space. After curatorial review, 1,000 cubic feet of space was required.

Example C consisted of practically a whole household of antique furnishings. Upon curatorial review of 106 items, only 12 were selected for the collections.

IV. MANAGEMENT CONTROLS

Except in the case of the Freer Gallery, where specific procedures were formulated by Charles Freer in 1919, written collection policies are comparatively new. Certain kinds of collection controls are inherent in the charters of HMSG and NPG. NCFA formalized certain controls in 1964 with a policy statement that was revised in 1965 and again in 1970. Cooper-Hewitt generated a policy statement a few years after entering the Smithsonian complex and NASM developed some firm procedures shortly after being organized in its present form. However, the two bureaus representing the oldest and largest of the Institution's collections operated without formal written collection policies until at least 1973 when NMHT issued its own.

EVOLUTION OF COLLECTIONS POLICIES

The absence of written policies in NMHT and NMNH was not so much an oversight as an intentional adherence to a tradition established by Secretary Joseph Henry in the Institution's earliest years. Although the Smithsonian charter* provided for the acquisition and management of museum collections in art, history and science, Henry regarded the development of a general public museum as secondary to another obligation. He felt strongly that the best way to increase knowledge was to conduct research and that the best way to diffuse

* See Act of 1846, 20 U.S.C. 41, et seq.

it among men was to publish the results. Consequently he encouraged SI scientists to pursue research projects and gave them great freedom in choosing their subjects. Their research centered heavily on the natural sciences, and usually required them to collect and study certain kinds of specimens. Henry understood this and approved of it. In fact, their specimen collections seem to have been the only ones that ever earned his full approval.

By the time the U.S. National Museum came into existence Henry's policies had been practiced for some 30 years. The personnel and collections available for assignment to it featured an overwhelming concentration in the natural sciences and an emerging second-priority interest in technology. These two dominant components gradually evolved into the museums known today as NMHT and NMNH. Through the years, the U.S. National Museum continued to operate according to the Henry philosophy that research was the primary function and collecting was an activity intended to support it. Scientists and technology-oriented scholars were hired as curators, and the individual research specialties of these curators determined the growth vectors of the collections. The Smithsonian earned a worldwide reputation among scientists and other scholars who came to depend on its collections for use in their own research.*

* The design of exhibits has not been neglected. During the past twenty years in particular, both museums have attracted large numbers of visitors with exhibits of increasing sophistication and educational value. However, because exhibit materials are usually selected from among objects and specimens already collected for other purposes, the impact of exhibition requirements on collecting philosophy has been a secondary one.

To a great extent this basic situation prevails in other Smithsonian museums but the need to depend heavily on the expertise of individual curators is felt most strongly in NMHT and NMNH, where the multidisciplinary characteristics of the collections force increasing generalization at each higher level of management.

In the other seven collecting bureaus, where the collections are substantially monodisciplinary, the need to depend on individual curators exists but is less critical. Partly because of this (and partly because of charters, legislation, etc., which contain provisions requiring higher-level approvals) management personnel became involved in collections decisions almost as soon as these bureaus were established. With one or two possible exceptions, the recency of policy documentation can be attributed to the fact that these bureaus have only existed in their present configurations for relatively few years.*

* The fact that all seven of these bureaus came into existence after Joseph Henry's time further reflects the far-reaching effects of the management philosophies fostered by his administration. Even the Zoo, established in 1889 by Samuel Langley, the third Smithsonian Secretary, was considered outside the scope of scientific pursuit as it was viewed in the Institution's early years. Most notable, however, was the long-standing low priority assigned to the Smithsonian's early obligations to art and nontechnological history. The original collection that evolved into what is now NCFA, for instance, arrived at the Smithsonian in 1858. Through the years that followed it received only minor attention. From 1865 to 1895 it was off the Smithsonian premises on loan to the Corcoran and the Library of Congress. From 1907 to 1920 it was the part-time responsibility of the head curator of the Anthropology Department in the U.S. National Museum. Although it was made the responsibility of a separate bureau in 1920 it did not achieve prominence until it was moved to its present location in 1968.

As an examination of the statements exhibited in Appendix B of this report will show, full formalization of policies even in some of these seven bureaus has been slow in developing. Nevertheless the intent of each Bureau to maintain administrative control over its collecting policies and procedures is clear.

CURRENT SITUATION AT NMHT AND NMNH

During the past few years conditions have made it mandatory for the two largest bureaus to examine all possible means of resolving their increasingly critical space problems. The three major interrelated possibilities are:

- o Securing additional space
- o Lengthening the range of planning for collection growth.
- o Increasing the involvement of management in acquisition decisions.

The first of these methods has already been discussed in this report as the stimulus for the CPM study.* The second requires careful analysis of collection growth, which is discussed in the next chapter. The third, and the one that has increasingly attracted management's attention, is the need for more clearly defined collections policies.

* See pg. 1

According to comments from NMHT, for instance, until about 1973 "each curator had pretty much first and final say regarding the collection process, though the department chairman usually saw the appropriate papers and could do something if he wanted to. In practice there was not likely to be a problem unless the object was of great size or if large front-end costs were involved." In that year, however, the Director of NMHT established a collections committee and work began on the policy statement which is reproduced in Appendix B of this report.

Similarly, as shown in the report from NMNH, in the past the scientific staff had been given considerable freedom in determining the numbers and kinds of new specimens to be added to the collections. However, "because of the great increase in the number of curators in the Museum since 1955, and the rapidly increasing cost of maintenance and storage of the collections, it has become necessary for the Museum administration to be more involved in deciding what can be added to the collections."* Consequently NMNH has developed a new policy that involves both peer and administrative review of proposed additions to the collections. (The statement of this policy appears in Appendix B.)

The collections committee at NMHT is a museum-wide committee with representation from its registrar's office as well as from each curatorial department.** Several NMNH departments are developing their own internal

* For additional information see Appendix A.

** At NMHT the registrar's office is officially designated the Collections Management Office and the registrar is the manager of that office. The NMHT policy statement does not stipulate specifically that each curatorial department must be represented. It states that the committee shall consist of from five to seven members plus the registrar. There are five curatorial departments, all of which were represented on the committee at the time of this study.

collections committees and consideration is also being given to a museum-wide committee. The rationale is that, while a departmental committee may help a department manage its share of the resources more efficiently, only a museum-wide committee can address itself to matters affecting the identification of priorities and the allocation of all the museum's resources among the departments.

It is recognized that peer review has the principal benefit of preventing collections from exceeding the limits of existing resources at the time of a recommendation. Under present guidelines the functions of existing or proposed collections committees make no explicit provision for the essential element of planning. The requirement that each recommendation of the NMHT Collections Committee be referred to the NMHT Director for decision and the allusion in the NMNH account to administrative review, as well as peer review, both acknowledge the need to refer significant decisions to higher management, where planning responsibility ultimately rests. However, planning is provided for only by implication. Whether long-range planning for collection growth should be addressed in a collections policy or whether it should be provided for in another way is perhaps a moot question. The matter is discussed more fully in Chapter V of this report. Meanwhile it must be noted here that planning is not mentioned explicitly in any of the Smithsonian's collections policy statements, neither those of the bureaus nor those of the Institution itself.

CHARACTERISTICS OF EXISTING POLICY DOCUMENTS

The acquisition and disposition policies of its museums, like other trust functions of the Institution, are under the ultimate supervision of the Board of Regents or of such boards or commissions as may have been established by statute (e.g., the HMSG Board of Trustees). In practice, specific decisions about museum property are made at various levels appropriate to the nature of the property and the potential impact of its acquisition or disposition. Such decisions range from numerous daily curatorial determinations about small objects of minor intrinsic value to major upper-echelon deliberations involving the assumption of responsibility for new programs or for significant additions to or possibly deletions from existing collections.

Because of the diversity of its units the Institution has not found it practicable to promulgate a uniform collections management policy. The process by which worthy specimens are culled from the proceeds of an archeological expedition, for instance, is quite different from the process of evaluating a major work of art for possible acquisition. Consequently each bureau has found it advisable to develop specific policies and procedures tailored to its needs. These, in turn, may be further refined by instructions from the Board of Regents, the Secretary, or the appropriate member of the Executive Committee.

Typical examples of such instructions are the Smithsonian Institution Policy on Museum Acquisitions (February 23, 1974) and a memorandum from Secretary Ripley to the directors of NCFA and NPG (May 22, 1970).^{*} These documents relate to international transfers of national and cultural property and to the

^{*} Reproduced in Appendix B of this report.

sale or exchange of works of art. If, however, the Institution had already developed the broad outline of an overall policy on collections policies it might have stipulated that instructions such as these be incorporated in the policies of the bureaus concerned. Also, if such a policy had existed, and if it had been reviewed periodically by SI staff personnel, they might have noticed that some of these instructions would apply to Cooper-Hewitt, HMSG and perhaps other bureaus. It so happens that certain of these instructions are incorporated in the Cooper-Hewitt statement. However, there is no Institution-wide program designed to make sure such instructions are incorporated in writing in all bureau policies, though, of course, they apply to all museum bureaus.

As far as bureau policies themselves are concerned, they have now been reduced to writing in all cases. The individual statements are reproduced in Appendix B of this report but it might be appropriate here to direct attention to a few of their characteristics. It can be observed, for instance, that very little uniformity exists. Some of them resemble common forms of policy-and-procedure documentation, some are collected extracts from charters and laws while others are essentially informal explanations of how things are normally done.

AUTHORITY REQUIRED FOR APPROVAL

References to the authority levels required for acquisition or deacquisition decisions are somewhat diverse. In some cases external boards

or commissions have been established to control such matters in specific museums. These are designated by the general term museum body in the following tabulation of how many times bureau policies mention levels above those of individual curators:

- o Director, museum body and higher SI administration (C-H)
- o Museum body and higher SI administration (Freer, NPG)
- o Director and higher SI administration (NMNH)
- o Director and museum body (HMSG)
- o Director only (NASM, NMHT, NZP)
- o No mention (NCFA)

In practice the Institution's Executive Committee, the Secretary and the Board of Regents do indeed become involved in certain major decisions about the acquisition of large collections or about new programs with significant potential impact on collections. Usually such involvement is prompted by special circumstances. Either a prospective new venture is proposed at a level higher than that of a bureau director at the outset or a bureau has been offered an unusual opportunity that appears to warrant consultation at a higher level. However, there seems to have been no attempt to stipulate, in any single promulgated statement of Institution policy, the criteria to be used by all in determining just when and under what circumstances such matters must be reviewed at top SI administrative levels.

The previously-mentioned memorandum from the Secretary to NCFA and NPG informs the directors of these two museums of a resolution by the Board of Regents stipulating the approval required for sale or exchange of a work of art valued at more than \$1000 and also the approvals required for sale or

exchange of a work valued at more than \$50,000. The CPM committee did not find similar instructions to Cooper-Hewitt. However, the Cooper-Hewitt's own policy statement does contain these provisions.

In certain cases bureau policies stipulate criteria to be used internally. The NMHT policy, for example, requires that a curator refer a proposed acquisition to that museum's collections committee if:

- o It involves a collection in excess of 20 objects; OR
- o It occupies a space exceeding 10 cubic feet; OR
- o Packing, transportation or storage costs will exceed \$100.

The collections committee must consider each such referral and make its recommendation to the NMHT Director, with whom the final decision rests.

The NMNH statement limits unreviewed acquisitions by an individual curator to a total volume not exceeding 100 cubic feet per year. It permits each department chairman to decide on larger collections exceeding this minimum level but remaining within the limits of the department's own allocation of space resources. Still larger collections must be referred to the NMNH Director, and for "truly larger" collections the NMNH Director must consult with and seek guidance from the Assistant Secretary for Science and the Secretary of the Institution.

The HMSG policy permits its director to purchase on behalf of the HMSG trustees any single work costing \$10,000 or less. It limits such purchases to one third of the museum's federal acquisition funds and \$20,000 of its trust funds in any given year.

After 120 years of reasonably close adherence to its traditional philosophies the Institution passed two major management milestones in the past two decades. One was a decisive acknowledgment of its original obligations to art and non-technological history. The other was acknowledgment of the need to develop collecting policies with management controls.

The introduction of management controls has been slow, tentative and cautious. Curators interviewed during the CPM study often expressed anxiety about the possibility that attempts to introduce management controls would lead to the imposition of arbitrary ceilings on collecting. Most managers realize, however, that arbitrary ceilings would negate the purposes and dissipate the benefits of museum collections. They know that collection growth is inevitable but they maintain that it must result from an intellectual plan, in accord with an overall Institutional goal rather than result from random accumulation.

The analysis of the written collections policies in Appendix B has made it apparent that the policies established to date do not provide adequate support for a program of planned collection growth. At least three elements appear to be either missing or insufficiently covered: collecting objectives, a periodic review of the status of collections and the impact they have on space allocation and staffing, and, lastly, Institutional coordination.

The development of broad collecting objectives by each museum would enable curators and bureau officials to focus more clearly on gaps in their

holdings and permit the Institution to begin an overall review of its potential future needs in space, resources and fields of collecting. With nearly one hundred separately identifiable collecting fields to be addressed among the bureaus and their subordinate units throughout the Smithsonian it would be a useful but formidable task. Nevertheless, in the long run it can be achieved. The greatest difficulty could be expected in NMHT and NMNH, where curators have always been encouraged to consider collecting as an adjunct to research rather than as an end in itself. But the distinction does not preclude the formulation of collecting objectives.

Existing fiscal and administrative practices do impact on collection activities. The common practice of placing dollar limits on single purchases at various management levels serves to keep procurement authority commensurate with management responsibility but it does not necessarily limit the aggregate of an organization's annual expenditures for collections. This is controlled by budgets. In addition, the fundamental precept of government procurement prohibiting the breakdown of a single-purpose contract into smaller ones in order to circumvent regulations provides, in itself, another control.

However, because most things added to the collections are obtained through donations or similar no-purchase actions, acquisitions must be controlled by mechanisms other than ordinary purchasing budgets. Although curators are required to seek approvals for acquisitions exceeding certain quantitative limits, the cumulative impact of smaller acquisitions by many curators could affect space resources significantly.

The nearest approach to space budgeting so far conceived by any SI bureau is the new NMNH policy restricting each curator to 100 cubic feet per year. This policy may have promising possibilities for other collections in other museums.

Even with such restrictions it would seem that periodic administrative review might be helpful. Knowing how much space was available and how much had been consumed each year, for instance, would permit management to plan future space needs more effectively.

While there is common agreement that the bureau level is the most appropriate one for detailed collections policies, it is evident that many inconsistencies could be eliminated by an overall policy on bureau collections policies. Some of these inconsistencies have already been alluded to earlier in this chapter. Undoubtedly more could be identified by an editorial inventory of the elements present or absent in the various documents and, just as the time seems to have come for deeper involvement of bureau management in collection decisions, perhaps the time has come also for a deeper involvement of SI administrative authorities in the formulation of collection policies.

V. COLLECTIONS GROWTH

Whatever policies are elected to govern the growth of collections, they have important implications for space and an impact on the overall management of a museum. What one might describe as "the care and feeding" of a collection is a constant process. It requires intellectual focus and, generally, daily physical monitoring. Hence in assessing space needs and staffing requirements, an understanding of the nature of the collections involved, of the pattern of their growth and the future directions that this growth might take are essential. Equally essential is a need to predict growth in broad terms, while realizing that there are always unknowns and that great care must be exercised in making judgements on the extent to which collections may have attained near completeness and to what extent there are critical gaps which limit the quality of interpretation or research potential.

Hence predicting the future growth of a collection is a hazardous process, and merely extrapolating graphs of past growth is a mindless, mechanical exercise. Thus, an attempt has been made, in the following pages and in the graphs incorporated in this section, to compare mathematically derived curves based on historical collection data with curves based on curatorial assessments of specific collecting needs and prospects. The comparisons have been made in an effort to demonstrate that present knowledge, carefully weighed and reviewed at several levels, is an essential ingredient in the prediction of future collection growth. In the graphs, extending to the year 2015, the forecasts based on curatorial assessments are represented by bold lines.

These charts are presented with diffidence, but with the conviction that they demonstrate that the curatorial staff of the Institution is overseeing the development of collections in a professional way and that it is subjecting them to a periodic re-examination based upon their increasing experience, new knowledge, and agreed upon policies.

INITIAL FORECASTING EXPERIMENT

The first attempt to forecast space requirements in the study was based on working papers prepared during an earlier investigation related to the proposed Museum Support Center (MSC). Six of the bureaus had been asked to estimate growth rates for the next ten years and their estimates were applied to measurements of currently available storage space in each bureau. Apparently assuming linear growth, the MSC investigators applied the appropriate rate to the number of square feet devoted to collection storage in each bureau as of 1976 and multiplied the result by ten to obtain a calculated figure for additional storage space needed by 1986.

For the purpose of developing crude projections of possible collection growth the percentage rates developed for the MSC investigation were applied experimentally to the totals for objects and specimens in the six bureaus. Because the decade from 1976 to 1986 seemed too short for a long-range view the rates were applied for the period extending to 2015. And because the assumption of linear growth had not yet been confirmed, curiosity prompted compounding the rates annually for comparison. The following results were obtained:

<u>Bureau</u>	<u>1976 size</u>	<u>Percent</u>	<u>2015 size (simple)</u>	<u>2015 size (compound)</u>
Freer	17,800	1.3	26,800	29,400
HMSG	6,400	5.0	18,900	42,900
NASM	24,600	1.3	37,000	40,500
NCFA	20,600	3.5	48,700	78,700
NMHT	14,727,000	5.0	43,445,000	98,741,000
NMNH	59,651,000	2.5	117,810,700	156,260,000

These results were unsatisfactory for a number of reasons, all relating to the absence of any rationale for confirming the validity of either set of figures. Discussions with curators revealed that many of them believed net growth had always been and always would be essentially linear. However, except for a few experiments in the charting of historical growth conducted in some bureaus, it appeared that no thorough statistical analysis of growth had ever been conducted and no analysis of any kind had been made on an Institution-wide basis.

Some members of the CPM committee felt that knowledge of past growth patterns would not only settle the question of linear vs. exponential growth but provide other clues helpful in making projections. Consequently it appointed a task force to compile collection-size statistics for all nine bureaus, going as far back in the past as possible.

HISTORICAL STATISTICS

It has been the practice at the Smithsonian for many years to prepare annual statistics on the number of objects or specimens in each collection. Figures provided by the curators in each museum are included in a report

compiled by the museum's registrar for submission to the Secretary. Until 1969 these statistical reports were published in the Smithsonian Institution Annual Report (now the Smithsonian Year). Although the registrar's reports are no longer published they are still submitted annually to the Secretary. Historical statistics for use in the study were compiled from these reports.

This procedure caused some problems in the cases of NMHT and NMNH. Some of the collections now in these two bureaus were started in the 1800's and administered by the old U.S. National Museum. In 1958 the collections of the National Museum were divided into two major groups to form the separate museums. The desire to trace growth in these two museums farther back than 1958 called attention to individual collections. Since statistics for these particular collections were always provided in the annual reports, the task force decided to use them. The original plan was to add up the figures to calculate pre-1958 totals for NMHT and NMNH, but this approach was later abandoned when the task force decided that statistics on the individual collections might be more useful. The effects of this decision are reflected in the tables and graphs presented on pages 64-125.

Effect of object size on space requirements

The compilation of statistics for individual collections called attention to the relative sizes of objects and specimens. Very small items sometimes represented large proportions, numerically, of a museum's holdings while very large ones represented small proportions. Calculation showed that stamps and coins, for instance, accounted for 87% of the NMHT total and entomology specimens accounted for 35% of the NMNH total.

While this had always been known the consequences had not been fully evaluated, and it had been considered that in a large museum size variations tended to cancel each other out. The comparatively large variations shown in these calculations introduced enough doubt about that assumption to suggest that space planning for every bureau might benefit from a collection-by-collection analysis of space needs.*

It was not possible to pursue the analysis further since the only space figures available to the committee were square-foot totals for the six bureaus represented in the MSC working papers. Subsequently NMNH provided square-foot breakdowns for the seven departments that manage collections in that bureau. These measurements were used, along with records of the holdings in the seven departments, to prepare the table on page 46a. While object size can be derived here only by inference, the table contradicts the assumption that size variations cancel each other out. It shows, for example, that Entomology, where the items are relatively small, contains 35.7% of the museum's specimens but occupies only 6% of its floor area. On the other hand Vertebrate Zoology, where holdings include some large animal skeletons, houses only 6% of the specimens but occupies 28.9% of the floor area.

* Toward the end of the CPM study, after the computer runs for the statistics and graphs had been completed and it was too late to start more, several other bureaus became interested in breaking down their statistics along the same lines. The NASM representative, for example, estimated that 90% of the cubic storage volume was occupied by aerospace vehicles which, by count, represented less than 10% of the collection. Similarly, NPG and NCFA began to think about prints, which take up far less space than some of their other holdings. Further investigations of size relationships can be expected to be made after this report has been issued so that results can be incorporated into the space planning and allocation effort.

The numbers in the column labeled Area Index represent the calculated number of objects accommodated in each square foot of the floor space currently allotted to each department and were derived by simple division. Curiosity prompted the calculation of these numbers and they are included here only to introduce the notion of what might be called a cubic index. The numbers of objects or specimens that can be accommodated per cubic foot of space might be a useful planning device. If it were based on the total amount of space needed for storage and operations in each collection it could be applied to collection growth projections and used to project probable space requirements.

It must be pointed out that the preparation of the table on page 46a was merely an intellectual exercise undertaken to test a hypothesis, and the figures in this table should be used with caution and for space planning purposes they must be regarded only as illustrative examples.

Problems with the annual reports

There is a general assumption that the historical statistics in the annual reports are inconsistent and sometimes unreliable. This might be expected since they cover a long time span and were tabulated by persons who no doubt had varying approaches. In the experience of the CPM task force, these statistics are difficult to use and sometimes misleading. It was often necessary to read the accompanying narratives in order to account for uncertain figures and occasionally necessary to consult museum registrars' records to find figures omitted from the reports. But on the whole the collection-size information, at least, seemed to be reliable. Since the CPM investigation

<u>Department</u>	<u>Specimens</u>	<u>Square Feet Allocated</u>	<u>Percentage of Holdings</u>	<u>Percentage of Floor Space</u>	<u>Area Index</u>
Entomology	21,297,000	22,500	35.7	6.0	947
Invertebrate Zoology	14,997,609	47,500	25.1	12.7	316
Paleobiology	14,151,014	77,700	23.7	20.8	182
Botany	3,689,787	37,500	6.2	10.1	98
Vertebrate Zoology	3,568,293	107,700	6.0	28.9	33
Anthropology	1,421,075	65,600	2.4	17.6	22
Mineral Science	526,232	14,500	0.9	3.9	36
MUSEUM	59,651,310	373,000	100.00	100.00	159

did extend back to reports from the 1800s it might be helpful to record a few observations here for future reference:

- o Inconsistent accessions reports. One of the difficulties in using statistics from the annual reports was caused by the practice followed by some curators in reporting material received during a given year. They often did not limit their reports to objects or specimens actually accessioned into the permanent collections. Rather, they sometimes included counts of collections borrowed for exhibition or study, items received for evaluation and other things intended to be held only temporarily. They were usually careful to refer to the totals with headings like "items received" and to give particulars in the narrative portions of the reports. But if the number recorded for current "additions" or "items received" is added to the previous year's collection total, the sum may be higher than the collection total reported for the current year.
- o Sudden drops and jumps. Every so often a collection will reflect an unusually large increase or decrease. Such a change can usually be traced to the receipt of a large collection or the transfer of a collection from one department to another (e.g., when the collection of 15,000 wood specimens was transferred from Agriculture and Mining to Botany in 1960). Or it may be the result of a new inventory, especially in an old collection of small organisms where the number of specimens is often derived from estimates of the contents of containers.
- o Reorganizations. Collection names have appeared, disappeared, and reappeared in kaleidoscopic fashion through the years, primarily as a result of the merging and separating of collections. Sometimes new areas of research or collecting were identified. Sometimes certain subcollections became large enough or important enough to be treated separately. Sometimes departments were reorganized with resulting redistribution of collections and, occasionally, renaming of collections whose contents underwent no actual changes.

Reorganization was the only one of the three observations having a significant effect on the CPM effort. As a result of identity problems the only one of the older collections that could clearly be traced back to the turn of the century was that of NZP. Some of the others could be followed back to the 1920s, but in several cases usable statistics only started much later. The wide variation in beginning years for the tables and graphs is the net result.

PROJECTING FUTURE GROWTH

Looking into the future is speculative by any standards, but debate about the most appropriate way to predict future growth in museum collections left no doubt that this was the most troublesome aspect of the CPM committee's assignment. Each member of the committee favored one or another of several forecasting techniques. A great deal of time was spent on efforts to achieve consensus until it was agreed that the committee itself could not and should not attempt to make firm projections. Several conclusions emerged from the discussions:

- o Growth should be projected separately for each collection within a museum or, alternatively, for each group of objects in a distinct size range.*

* The aerospace vehicles at NASM offer a typical example. They constitute a group falling within a distinct size range yet there is no separately administered aerospace vehicles collection in the NASM organization.

- o The person best equipped to decide on methodology and to use that methodology to make growth projections for a collection is the curator. The curator is most apt to know the reasons behind past growth patterns and the reasons why future growth must either conform to historical patterns or differ in some way.
- o Bureau managers at all levels should review curatorial projections and challenge any that appear to require justification before collection growth projections are incorporated into the overall space planning effort.
- o The discussions of collection growth in the CPM report, including the theoretical projections in the charts, should be viewed as sources of background data and suggested approaches to be used by others in planning for collection growth and space utilization.

Growth projection techniques

A number of different projection techniques were suggested to the committee. Because each one seems to be a variation on one or another of three basic procedures, this report will be limited to discussions of those three.

Perhaps the favorite procedure among curators involves examining growth records for recent years, considering whether current circumstances will support the same kind of growth or a different kind of growth in the foreseeable future, and making a prediction accordingly. Usually such a prediction is limited to a short time, perhaps a decade, and is expressed as a percentage of today's collection size. Then, at the end of the next decade, the process begins again.

An example of this procedure is offered by NMNH (Page A-56). Having determined how many specimens had been added in each of the past three decades, NMNH calculated each increment as a percentage of the total collection at the

beginning of each decade. Thus the rates were 250% of the 1945 size, 16% of the 1955 size and 18% of the 1965 size. Selecting the most recent decade as its base, NMNH divided by ten to get an average rate equal to 1.8% of the 1965 size. After considering growth in individual collections and exercising some judgment about future collections the bureau estimated that 12,700,000 specimens would be added between 1975 and 1985. (This amounts to 22% of the 1975 size and would probably be expressed as an annual growth rate of 2.2%.)

Another technique favored by some is plotting the typically jagged line representing past growth over a fairly long period, laying a straightedge over the line, adjusting it to follow a more or less central path through the jagged plot, and drawing a straight line extended some distance beyond the plot.

Both of these procedures are based on the assumption that net collection growth is always linear. But the historical tables of collection sizes show that some collections tend to grow more rapidly as they get bigger. These hints of exponential growth raised enough questions to warrant something more sophisticated than visual inspection of tables and graphs.

The committee therefore enlisted the aid of a statistician and a programmer from the Office of Computer Services to conduct a regression analysis of the historical figures and use the Institution's automatic plotter to prepare graphs. Regression analysis amounts to an analytical version of "curve fitting" where mathematical calculations are used instead of visual comparisons. The mathematical calculations produce an equation that when plotted on graph paper will yield a smooth curve. That smooth curve conforms to the general directions taken by the actual plot.

When a smooth theoretical curve is superimposed over a plot of actual growth it is possible to see the general direction growth is apt to take if the conditions that influenced the earlier growth continue to prevail. These conditions must be identified and carefully evaluated when projecting growth of a museum collection. For instance, if a collection grew at a gradually increasing net rate primarily because the number of people responsible for additions to that collection had also increased during the same period, the collection could continue to grow exponentially in the future only if the number of people responsible also increased exponentially. On the other hand, if a collection grew exponentially while staff resources remained constant there is still a possibility that the collection will continue to grow exponentially.

People who are not accustomed to dealing with exponential curves find it difficult to accept their sharp upward sweeps and tend to doubt their validity. This problem has already arisen in connection with the curves displayed in the charts. The situation is analogous to reactions prompted by the doubling of numbers. Low numbers in a series like 1, 2, 4, 8, 16, 32, 64 and even 128 are easily understood, but when the series reaches 256, 512, 1024, 2048, 4096, etc., the rapid increases seem startling.

With some of the curves the approximation is fairly easy to detect by observation; with others the closeness is not so readily apparent. The difficulty of observing some of the approximations can be attributed in part to the decision to use the automatic plotter. This computer-driven device has

the advantage of changing the scale of each graph to permit all the images to be produced in the same size regardless of how great the numbers get. It has the disadvantage of making the actual plot so small, in order to accommodate large values in a theoretical plot, that the true path of the actual plot is hard to detect visually.

The graph for the Freer collection on Page 57 is one that should invite no challenges. It confirms the assumption that growth, at least in this particular collection, has been linear. To test the curve fitting against the percentage techniques previously mentioned, calculations were performed to obtain average annual growth percentage:

o	Actual growth	1926-1976	0.26% of 1926 size
o	Actual growth	1966-1976	0.23% of 1966 size
o	Predicted growth	1977-2007	0.22% of 1977 size

The closeness of these percentages tends not only to confirm the appropriateness of the theoretical path derived by regression analysis but also to confirm the validity of the average annual percentage as a forecasting device when linear growth is to be assumed.

COLLECTION GROWTH CURVES

Cooper-Hewitt

Actual Collection Sizes

1971	92,000
1976	101,845

Curatorial Assessment

At the present time the Museum is anticipating receipt of some representative materials in industrial design and advertising art. These acquisitions, with arrivals extending over the next five or six years, will cause a temporary rise in the growth rate. Afterward it is expected that growth will proceed at a fairly constant rate roughly conforming to the path of the statistical projection but at a slightly higher level.

It should be noted that there will be apparent contradictions between the figures used for these projections and figures appearing in various publications referring to the Cooper-Hewitt collection. The differences are manifestations of a change in recording philosophy. Before Cooper-Hewitt became a Smithsonian bureau it was not uncommon for a set of related pieces to be recorded and counted as a single entity even though certain individual items in such a set might have important design characteristics of their own. Because some items were indeed recorded and counted individually, collection-size figures still represent mixtures of sets and singles. Estimates have been made from time to time in order to determine the approximate number of significant single items in the collection, and the figures obtained through these estimates are of course higher than those shown here.

COOPER-HEWITT
ACTUAL AND PROJECTED COLLECTION SIZES

FREER

Actual Collection Sizes

1923	15,942
1976	17,842

Curatorial Assessment

"The projected curve indicating the probable future growth of the collections in the Freer Gallery of Art, conforms to our own calculations. The Gallery's acquisition policy has always been guided by an unswerving concern for obtaining objects of the highest quality, and, at the same time, tempered by varying financial restrictions. Admittedly, there have been occasions when an unexpectedly large number of objects were acquired in a single fiscal year. One instance was the Agnes E. Meyer bequest of 1968. It is conceivable that from time to time comparable increases in our annual acquisitions might occur in the future. However, at the present time, there is no compelling reason to believe the Gallery's future growth will vary significantly from that indicated in the statistical projection."

FREER
ACTUAL AND PROJECTED COLLECTION SIZES

Actual Collection Sizes

1973	6,221
1976	6,416

Curatorial Assessment

"The Museum is still far too young to have developed any pattern from which the future growth of its collection might be projected. Beyond this, the fact that it has been treated statistically as a single 'collection' introduces the same problem of meaningless numbers that has been encountered as to mixed collections elsewhere during this study, i.e., that one-hundred drawings stored in a single envelope are treated as one-hundred times as many items as a twenty-ton sculpture purchased at a considerably higher price. Finally, the imponderables involved in collecting contemporary art are such that no projection could be sound unless we knew with more certainty both the media and scale in which visual artists might be working in 1995 or 2004.

"Notwithstanding this, the statistical projection appears too low. The three-interval base from which this projection was made includes one year when the Museum had not yet opened, one year during which it was open for only part of the time and one year of full operation. The increase in the first interval was twenty-one works of art, in the second interval it was twenty-eight works of art and in the third -- when the Museum was in full operation -- it was one hundred forty-six works of art. (This third interval was, in fact, fifteen months because of the transition to the new October 1 fiscal year.) Incomplete figures for 1977 suggests that the total number of items to be accessioned in the fourth interval will be in the range of seventy to eighty.

"In summary, our immediate recent experience and the questionable base from which the graph was prepared would seem to indicate that the theoretical projection is too low. As a pure speculation, a compound rate of an increase of one and one-half percent annual growth might have the right feel."

HMSG

ACTUAL AND PROJECTED COLLECTION SIZES

NASM

Actual Collection Sizes

1948	4,529
1976	23,661

Curatorial Assessment

"During the ten years from 1957 through 1966, the NASM collection grew at an average rate of 382 items per year, while during the period 1967 through 1976, the average rate was 1381 items per year. This increase was due to several factors, the most important being the growth of the U.S. space program culminating in the moon landing in 1969. Also, in 1966, the National Air Museum became the National Air and Space Museum, and the collecting of artifacts from the NASA space program began. In 1969 NASM and NASA concluded an agreement whereby all spaceflight artifacts were offered to NASM when no longer required by NASA.

"The corrected growth curve reflects a gradual decrease to an annual rate of about 1000. Several factors lead to this predicted rate:

1. The larger NASM professional staff allows more careful study and selection of items from offered collections and eliminated the need to take entire collections to avoid missing a few key items.
2. The activity in the U.S. space program has decreased considerably and is not expected to increase markedly in the near future.
3. The large size of modern aircraft makes it impractical to add them to the collection, and their very high cost makes them less likely to be offered.
4. There are relatively few older historically or technologically significant aircraft in existence that NASM could reasonably hope to acquire.
5. The proliferation of air museums in the U.S. has increased the competition for aviation artifacts.

"In addition to the above, NASM has just begun a complete computerized inventory of its collection. This will allow the identification and subsequent disposal of duplicate and other surplus items now in the collection. Many of these surplus items will be donated to other air museums.

"It is possible that by very careful selection and control of incoming items and by diligent screening of items already in the collection that the accession rate can be reduced below the predicted rate of 1000 items per year."

NASM
ACTUAL AND PROJECTED COLLECTION SIZES

NCFA

Actual Collection Sizes

1965	7,786
1976	20,578

Curatorial Assessment

"It can be estimated that the collections of the National Collection of Fine Arts will grow by approximately 1000 works a year for the next ten years. After that it can be anticipated that the rate should increase to about 1500 for the next 15 years. A projected increase after that should be about 2000 works a year.

"This increase can be anticipated from several factors. The present growth rate should continue for about a decade, but the NCFA continues to grow in significance and its role in the art of the United States carries tremendous responsibility: the inevitable diminishing of major private collections means an increased responsibility for art museums, and in particular NCFA as a national museum, to preserve our art. In-depth selections from selected major artists' estates are being added to the collection at an increasing rate, which will account for additional annual growth. The collection must be augmented in general to fairly represent all important phases of American art, both past and present, and as the history of American art is expanded, works by more artists will be added.

"The ratio of about 70 percent of the works being on paper and of easily stored sizes should continue, but at the same time some paintings and sculpture are of increasingly large dimensions, and some contemporary pieces in untraditional media and expressions present difficult storage and management problems."

NCFA
ACTUAL AND PROJECTED COLLECTION SIZES

NMHT - Agriculture and Mining

Actual Collection Sizes

1960	10,075
1976	17,670

Curatorial Assessment

"Relatively complete in drilling equipment, weak in Western U.S. for mining equipment. Need to collect 20th Century farming equipment." It is estimated that by 1986 the collection will have increased by 20% of its 1976 size, and by 1996 by 35% of its 1976 size.

Editorial Note

NMHT curators are reluctant to predict growth for periods exceeding twenty years. The curatorial curve has been extended as a straight line to the year 2015 to facilitate comparison with the statistically derived curve.

The sharp jump in 1975 was caused by the acquisition of 400,000 advertising items which have since been reclassified as documentary materials. The inclusion of this large number caused a corresponding rise in the calculated curve.

NMHT - AGRICULTURE AND MINING
ACTUAL AND PROJECTED COLLECTION SIZES

NMHT - Ceramics and Glass

Actual Collection Sizes

1958	13,127
1976	22,237

Curatorial Assessment

"Previous estimate was for a substantial increase, especially in glass, which would amount to more than tripling the collection in 20 years. The recent loss of two curators in the division, and re-assignment of the collections into Cultural History make the future uncertain." No curatorial projection is included for this graph.

NMHT - CERAMICS AND GLASS
ACTUAL AND PROJECTED COLLECTION SIZES

NMHT - Electricity and Nuclear Energy

Actual Collection Sizes

1958	3,342
1976	12,641

Curatorial Assessment

"Electrical collections in communications, especially radio and telegraphy, are quite good. There are still gaps in these and other areas in the 20th century. Batteries are especially weak. There are some large collections of vacuum tubes which we would get if we could, to add to a modest present collection. Nuclear Energy (now Modern Physics) is a relatively new area of concentration, and although it has good collections of particle accelerators and bubble chambers, there is likely to be considerable activity for some years to come in areas like cryogenics, superconductivity, x-ray spectrometry, nuclear fusion, and the development of laboratory electronics." It is estimated that by 1986 the collection will increase by 50% of its 1976 size, and by 1996 by 75% of its 1976 size.

Editorial Note

NMHT curators are reluctant to predict growth for periods exceeding twenty years. The curatorial curve has been extended as a straight line to the year 2015 to facilitate comparison with the statistically derived curve.

NMHT - ELECTRICITY AND NUCLEAR ENERGY
ACTUAL AND PROJECTED COLLECTION SIZES

NMHT - Manufacturing

Actual Collection Sizes

1958	28,771
1976	37,653

Curatorial Assessment

"This collection has been disbanded into separate divisions, which makes projections difficult. One area that will be pursued vigorously is food processing: canning, processing of agricultural products (snuff, cigars, cigarettes, etc.). Dairying and milling areas are more complete."

Editorial Note

The Warshaw collection of business Americana was reported in 1972 as an addition of one million items to this collection. The sudden increase at the time from 37,334 to 1,037,334 affected the statistical calculations and resulted in the abnormal graph shown on the opposite page. Because the computer-generated scale runs from 200 million to 3 billion, the increase of a million items represents 1/200th of the half-inch interval at the bottom of the graph and is therefore not detectable by the human eye.

The Warshaw collection recently was reclassified as a documentary collection to be relocated elsewhere. (Cf. Agriculture and Mining). Although the Manufacturing collection is in a state of flux at the present time, conferences with the curatorial staff suggest that the 37,653 items in the current aggregate, though redistributed, will reach a total of approximately 60,000 by 2015.

NMHT - MANUFACTURING
ACTUAL AND PROJECTED COLLECTION SIZES

NMHT - Medical Sciences

Actual Collection Sizes

1926	13,100
1976	42,867

Curatorial Assessment

"Pharmacy and drug collections are large and will probably have more time spent on them for description than growth. Hospital equipment, health, safety are areas that have not received attention in the past and probably will in the near future." It is estimated that by 1986 the collection will increase by 30% of its 1976 size, and by 1996 by 60% of its 1976 size.

Editorial Note

NMHT curators are reluctant to predict growth for periods exceeding twenty years. The curatorial curve has been extended as a straight line to the year 2015 to facilitate comparison with the statistically derived curve.

NMHT - MEDICAL SCIENCES
ACTUAL AND PROJECTED COLLECTION SIZES

NMHT - Military History

Actual Collection Sizes

1933	27,488
1976	59,126

Curatorial Assessment

"Weapons of the 'black powder' era are fairly complete, also uniforms. More attention now being paid to accessories (loading tools, bullet moulds, etc.), militia dress and equipment." It is estimated that by 1986 the collection will have increased by 30% of its 1976 size, and by 1996 by 50% of its 1976 size.

Editorial Note

NMHT curators are reluctant to predict growth for periods exceeding twenty years. The curatorial curve has been extended as a straight line to the year 2015 to facilitate comparison with the statistically derived curve.

NMHT - MILITARY HISTORY
ACTUAL AND PROJECTED COLLECTION SIZES

NMHT - Naval History

Actual Collection Sizes

1933	2,510
1976	20,322

Curatorial Assessment

"Good collection of WWII uniforms that will need modest increases; earlier (and later) material weaker. Gaps in enlisted-men's uniforms, auxiliary equipment (shoes, knapsacks, etc.). Large gaps exist in auxiliary shipboard equipment." It is estimated that by 1986 the collection will have increased by 50% of its 1976 size, and by 1996 by 100% of its 1976 size.

Editorial Note

NMHT curators are reluctant to predict growth for periods exceeding twenty years. The curatorial curve has been extended as a straight line to the year 2015 to facilitate comparison with the statistically derived curve.

NMHT - NAVAL HISTORY
ACTUAL AND PROJECTED COLLECTION SIZES

NMHT - Numismatics

Actual Collection Sizes

1933	45,802
1976	531,093

Curatorial Assessment

"This is a large collection that tries to be definitive. New material is collected as it is produced and gaps in older areas are filled as items become available." It is estimated that by 1986 the collection will have increased by 50% of its 1976 size, and by 1996 by 100% of its 1976 size.

Editorial Note

NMHT curators are reluctant to predict growth for periods exceeding twenty years. The curatorial curve has been extended as a straight line to the year 2015 to facilitate comparison with the statistically derived curve.

NMHT - NUMISMATICS
ACTUAL AND PROJECTED COLLECTION SIZES

NMHT - Philately

Actual Collection Sizes

1933	391,131
1976	12,269,854

Curatorial Assessment

"Argument the same as for numismatics on the philately side. Associated equipment (sorting boxes, machinery) is not extensive, and expect gaps to be filled as items are made available." It is estimated that by 1986 the collection will have increased by 40% of its 1976 size, and by 1996 by 80% of its 1976 size.

Editorial Note

NMHT curators are reluctant to predict growth for periods exceeding twenty years. The curatorial curve has been extended as a straight line to the year 2015 to facilitate comparison with the statistically derived curve.

NMHT - PHILATELY
ACTUAL AND PROJECTED COLLECTION SIZES

NMHT - Physical Sciences

Actual Collection Sizes

1958	2,111
1976	6,031

Curatorial Assessment

"Major sources of material in the past have been universitied (as they constructed new science buildings), and these have pretty well dried up. Major gaps are in auxiliary astronomical apparatus, various forms of chemical apparatus. We have the beginnings of a good plastics collection which needs further filling out." It is estimated that by 1986 the collection will have increased by 65% of its 1976 size, and by 1996 by 110% of its 1976 size.

Editorial Note

NMHT curators are reluctant to predict growth for periods exceeding twenty years. The curatorial curve has been extended as a straight line to the year 2015 to facilitate comparison with the statistically derived curve.

NMHT - PHYSICAL SCIENCES
ACTUAL AND PROJECTED COLLECTION SIZES

NMHT - Political History

Actual Collection Sizes

1958	37,533
1976	60,289

Curatorial Assessment

"Though this is true elsewhere as well, special emphasis was made here on the tentativeness of predictions. Much has been collected in recent years of campaign material; some early gaps need to be filled, but main emphasis is likely to be on newly-generated material. Collections of minority-rights material are lacking and will receive attention. Other areas (first-ladies' gowns, etc) will be filled in as appropriate and possible." It is estimated that by 1986 the collection will have increased by 20% of its 1976 size, and by 1996 by 40% of its 1976 size.

Editorial Note

NMHT curators are reluctant to predict growth for periods exceeding twenty years. The curatorial curve has been extended as a straight line to the year 2015 to facilitate comparison with the statistically derived curve.

NMHT - POLITICAL HISTORY
ACTUAL AND PROJECTED COLLECTION SIZES

NMHT - Textiles

Actual Collection Sizes

1958	32,860
1976	40,101

Curatorial Assessment

"Collections of quilts, lace, sewing machines are reasonably complete and will be filled in with care. Areas that have not received detailed attention and where there are gaps include 20th-century fabrics (including synthetics), sewing tools, and certain large knitting and weaving machines (both 19th and 20th centuries)." It is estimated that by 1986 the collection will have increased by 25% of its 1976 size, and by 1996 by 50% of its 1976 size.

Editorial Note

NMHT Curators are reluctant to predict growth for periods exceeding twenty years. The curatorial curve has been extended as a straight line to the year 2015 to facilitate comparison with the statistically derived curve.

NMHT - TEXTILES
ACTUAL AND PROJECTED COLLECTION SIZES

NMHT - Transportation

Actual Collection Sizes

1958	22,227
1976	63,639

Curatorial Assessment

"Areas without appreciable gaps include items like rail samples, spark plugs. Otherwise there is a general need for more accessory items. Early ship model collection is very good, but needs to be extended into age of steam, and especially into recent period of revolutionary change in construction methods. Collection of steam locomotives, among the large items, is good; we need passenger cars, freight cars, diesel locomotives. Automobile collection could be greatly improved if space were available. Gaps in shipping include electronic navigational items, and larger engine-related equipment that is available. Full-sized boats -- even small ones -- will probably not form a collection because of storage problems and because they are being preserved elsewhere." Estimate depends on availability of space. If substantial space were available the increases might be 100% of the 1976 size by 1986 and 200% of the 1976 size by 1996. Otherwise expect the collection to increase by 30% of collection size by 1986 and 60% of 1976 collection size by 1996.

Editorial Note

NMHT curators are reluctant to predict growth for periods exceeding twenty years. The curatorial curve has been extended as a straight line to the year 2015 to facilitate comparison with the statistically derived curve.

NMHT - TRANSPORTATION
ACTUAL AND PROJECTED COLLECTION SIZES

NMHT - Collections Not Plotted Mathematically

Five NMHT collections were omitted from the mathematical analysis project because they were too new, in their current configurations, to provide adequate historical bases for suitable statistical treatment. However, they have been subjected to curatorial evaluation and forecasting. Curatorial assessments and growth estimates for these collections are provided below.

Cultural History. "Early lighting, food preparation, ceramics, tinware are generally in good shape. But here as elsewhere there is a need to obtain non-East Coast material and representative examples of higher-class items. Sports, entertainment, labor history, which have had little special attention in the past will receive it now. This is an area undergoing substantial change and it is difficult to predict what may happen." It is estimated that the collection may increase by 300% or more of its 1976 size by 1986, and by 600% or more of its 1976 size by 1996. (Collection size in 1976: 47,127)

Graphic Arts. "Press collection reasonably complete. Gaps in type-setting and foundry equipment, type samples. Estimate collecting at same rate as in immediate past." It is estimated that by 1986 the collection will have increased by 40% of its 1976 size, and by 1996 by 80% of its 1976 size. (Collection size in 1976: 1,809)

Mathematics. "Special emphasis (during the next ten to twenty years) on computers of the post-1930 period." It is estimated that by 1986 the collection will have increased by 80% of its 1976 size, and by 1996 by 130% of its 1976 size. (Collection size in 1976: 61)

Mechanical and Civil Engineering. "Most collections are reasonably representative and will grow slowly. New emphasis on machine tools should produce a closing of gaps there; likewise for hand tools. New emphasis on automata should produce modest increases in numbers -- including items like pinball machines, soft drink machines, etc." It is estimated that by 1986 the collection will have increased by 50% of its 1976 size, and by 1996 by 100% of its 1976 size. (Collection size in 1976: 30,164)

Photographic History. "Cameras are fairly representational except for modern period. Important collections of photographs are continually being turned down because of lack of space; would like to collect them if space were available." It is estimated that by 1986 the collection will have increased by 50% of its 1976 size, and by 1996 by 90% of its 1976 size. (Collection size in 1976: 1,460)

NMNH - Archeology

Actual Collection Sizes

1931	465,242
1976	1,175,904

Curatorial Assessment

"I predict that the growth shown in the graph will remain approximately as shown in the curve constructed by you. We will not be adding to the staff in that department; but, if the present staff has established the growth pattern that you see between 1960 and 1973, the little spurt in 1974 is the result of only the addition of a particular collection and is not meaningful over the long run. Although it's becoming more and more difficult to get materials from foreign countries, we are doing a lot of archeological collecting in this country and in South America. I think we will continue to add materials at about the same rate."

NMNH - ARCHEOLOGY
ACTUAL AND PROJECTED COLLECTION SIZES

NMNH - Birds

Actual Collection Sizes

1926	327,084
1976	559,262

Curatorial Assessment

"There is no doubt in my mind that the rate of addition to the collections of birds is going to decrease in time. Our collections now include most of the birds that are extant and it is very unlikely that more than a handful of new species will be found. Also, it is becoming more and more difficult to obtain materials from foreign countries."

NMNH - BIRDS
ACTUAL AND PROJECTED COLLECTION SIZES

NMNH - Botany

Actual Collection Sizes

1926	1,255,450
1976	3,689,787

Curatorial Assessment

"The Botany collections should grow at the same rate as in the past few years. We do not anticipate any increase in this staff. There will be some decrease, in the long run, in addition, because of the difficulty in getting materials out of foreign countries, and because our collection is becoming more adequate with time."

NMNH - BOTANY
ACTUAL AND PROJECTED COLLECTION SIZES

NMNH - Crustacea

Actual Collection Sizes

1966	1,477,157
1976	3,284,883

Curatorial Assessment

"There is no question in my mind that there will be only a slight increase in this collection in the next 20-30 years. The big biological oceanographic surveys are over now and most of the common species have been collected."

NMNH - CRUSTACEA
ACTUAL AND PROJECTED COLLECTION SIZES

NMNH - Echinoderms

Actual Collection Sizes

1966	80,244
1976	218,284

Curatorial Assessment

"I have just written a research paper on this subject and it is my opinion that most of the species of living echinoderms have now been collected and are represented in museums. It is very unlikely that we'll have any increase (of any size) in this collection in the near future."

NMNH - ECHINODERMS
ACTUAL AND PROJECTED COLLECTION SIZES

NMNH - Entomology

Actual Collection Sizes

1933	4,141,686
1976	21,297,300

Curatorial Assessment

"We anticipate no increase in the size of our staff in the Department of Entomology. Most of our present workers already have collected extensively in their own fields or disciplines and I see no reason to believe that the rate of growth will increase over what it has been in the past."

NMNH - ENTOMOLOGY
ACTUAL AND PROJECTED COLLECTION SIZES

NMNH - Ethnology

Actual Collection Sizes

1926	158,535
1976	205,010

Curatorial Assessment

"I predict that we will continue to grow at a rate somewhat equal to what we have been averaging in the last 20 years. We will be adding no more staff and are faced with the problem of getting material from foreign countries. However, I think we will probably be successful in adding to the collections at about the present rate."

NMNH - ETHNOLOGY
ACTUAL AND PROJECTED COLLECTION SIZES

NMNH - Fishes

Actual Collection Sizes

1926	691,439
1976	2,342,891

Curatorial Assessment

"I am certain that our collections will not increase any more than it has in the last few years. We are adding no more scientists in this field and it is becoming increasingly difficult to find new material in our field research."

NMNH - FISHES
ACTUAL AND PROJECTED COLLECTION SIZES

NMNH - Mammals

Actual Collection Sizes

1926	81,997
1976	482,473

Curatorial Assessment

"I think the decreasing rate that you see in the curve between 1960 and 1975 will continue. Our collection is large and includes most of the common forms. It will become more and more difficult to find material to add to the collections."

NMNH - MAMMALS
ACTUAL AND PROJECTED COLLECTION SIZES

NMNH - Meteorites

Actual Collection Sizes

1964	5,000
1976	14,307

Curatorial Assessment

"There is no doubt that there will be a very slight increase in this collection. Over the last hundred years, almost all the large meteorites that have fallen over the last few million years have been collected. The main number to be collected henceforth will be ones which fall during the next 20 years. Needless to say, this will be a very small number; therefore, we can expect very little growth in this collection."

NMNH - METEORITES
ACTUAL AND PROJECTED COLLECTION SIZES

NMNH - Mineralogy

Actual Collection Sizes

1966	121,648
1976	202,690

Curatorial Assessment

"There will be some increase in this collection but not very much. We now have in our collections specimens of almost every species of minerals and there will be very few new ones found in the future."

NMNH - MINERALOGY
ACTUAL AND PROJECTED COLLECTION SIZES

NMNH - Mollusks

Actual Collection Sizes

1966	9,941,443
1976	10,570,172

Curatorial Assessment

"I predicted such a large increase in the mollusks collection because we have just hired Dr. Arthur Clarke to work on fresh water mollusks. He is an exceedingly energetic person in a field in which there has not been an energetic person for many years. He is starting a monograph on the freshwater mollusks of the United States and I am sure this will result in many collections added to this Museum."

APPENDIX A

Statements by the Bureaus About Their Collections

COOPER-HEWITT

In 1859 Peter Cooper, one of the extraordinary Americans of the nineteenth century, opened an institution consisting of a free school, a library, and a lecture forum. This educational facility, called the Cooper Union for the Advancement of Science and Art, was available to the respectable needy without regard for race, color or sex. It provided education for thousands of men and women, many of them immigrants, who might otherwise have been bound to employment with little future.

The entire establishment of Cooper Union -- administration, programs, and building -- was financed by Peter Cooper. Among the activities he had wished to include, but could not afford at the time, was a museum of "art, science, and nature." Although the resources of the young institution did not permit the immediate formation of collections, the original plans provided space for a museum.

Late in the century Cooper's granddaughters, Sarah, Eleanor and Amy Hewitt, decided to establish the museum envisioned by their grandfather. Their sense of the practical, as well as their own tastes and interests, led them to propose not a general museum -- New York by this time had already acquired both an art museum and a natural history museum -- but a museum that could serve the designer, the artisan, and the student. In their travels abroad the Hewitt sisters had seen and admired the collections of the South Kensington Museum (now the Victoria & Albert Museum) in London and the Musée des Arts Décoratifs in Paris, and they strongly believed that a similar collection would be useful in raising the

standards of design in this country. In May of 1897 the Hewitt sisters opened the Cooper Union Museum for the Arts of Decoration.

Within a few years several important private collections were acquired by gift or purchase. The gift by J. Pierpont Morgan of three European textile collections placed the Cooper Union in the rank of the South Kensington and Berlin museums in the field of textiles. The Museum also acquired the Italian architectural and decorative drawings belonging to the Cavaliere Giovanni Piancastelli, Curator of the Borghese Collection. Several years later, the Museum purchased the remarkable collection of Léon Décloux, an architect and interior designer of Sèvres, which included samples of eighteenth-century French decoration in drawings, woodwork, hardware, prints and books. Later acquisitions continued to maintain this high level of quality and today the Museum is considered one of the foremost repositories of decorative arts and design in the world. The collections encompass objects from all parts of the world and from every historical period over a span of 3000 years -- drawings, prints, wallpapers, textiles, ceramics, glass, furniture, woodwork, metalwork, jewelry -- and every conceivable category including architecture, urban and industrial design, advertising, fashion, interior, home furnishings. The Museum's library and picture archive have become one of the outstanding design reference centers in America.

Over the years the Trustees of the Cooper Union found it increasingly difficult to operate their many free facilities and in 1963 reluctantly decided to discontinue the Museum. This action was followed with predictable public outcry, and a committee was formed to save the Cooper Union Museum. Through the intercession of the American Association of Museums, the collections were entrusted to

the Smithsonian Institution. In 1968, after the transfer was accomplished, the Museum's name was changed to the Cooper-Hewitt Museum of Decorative Arts and Design, Smithsonian Institution.

In 1972 the Carnegie Corporation deeded the Carnegie property to the Smithsonian as a new home for the Museum. The site, consisting of the Andrew Carnegie Mansion and an adjoining townhouse and gardens, stretches the length of an entire block on Fifth Avenue between 90th and 91st Streets. The buildings lend themselves admirably to showing everyday objects in human scale and in interesting relationships of old and new. Certain parts of the mansion have been restored to their original state and other parts renovated to the modern requirements of the Museum. The collections will continue to reflect this apposition of old and new, making possible the study of the processes as well as the products of design.

The objects are therefore divided in terms of medium and technique rather than culture, period or historical chronology:

- o Drawings and prints. Restricted primarily to architecture, design and ornament, the holdings of drawings are numerically the largest in the United States. Numbering more than 30,000 examples, the collection is over three times as large as its nearest American rival and ranks with the world's three great bodies of similar material: the Victoria & Albert in London, the Musée des Arts Décoratifs in Paris, and the Kunstbibliothek in Berlin.

The eighteenth- and nineteenth-century Italian designs for architecture and decoration are unsurpassed anywhere. Several thousand French designs for textiles and decoration and the holdings of French ornament prints have no rival outside France. Only the Library of Congress has a larger group of American wood engravings. North European woodcuts and engravings by Schongauer, Durer, Van Leyden, and Rembrandt, among others, are plentifully represented by excellent impressions. A group of over 200 prints by the Tiepolo family, many in early, rare impressions, is important.

The categories of design are extremely varied and include, among others, drawings for theater, scenery, and costumes; wall and ceiling decoration; architectural ornament, furniture, festival decoration, lighting fixtures, metalwork, jewelry, garden plans, and ecclesiastical furnishings.

The collection also has a sizable section of nineteenth-century American drawings, including the largest repository of drawings by Winslow Homer in the world, more than 2000 sketches by Frederic Edwin Church, and drawings in quantity by Daniel Huntington, Elihu Vedder, and Thomas Moran.

- o Earthenware, Stoneware, Porcelain, and Glass. Conceived to illustrate the evolution of ceramics from antiquity to the present, the collection provides a survey of European porcelain and its interrelation with Oriental stoneware and porcelain prototypes. Remarkably fine pieces of porcelain are represented, especially in the proportionately large group of eighteenth- and nineteenth-century European figurines, many of them of the Four Parts of the World. The collections also contain examples of Classical, Oriental, and European earthenware, such as Italian majolica, German stoneware, French, German and Italian faience, and wall and stove tiles from several places of origin.

Although comparatively small, the glass collection has the potential of developing into one of major significance because of its scope and fine quality. The range includes ancient glass, a few medieval Middle Eastern examples, and European objects from the seventeenth century to the present. Among these are a Nevers figurine, Irish candelabra and a chandelier, German and Bohemian engraved goblets and covered cups, cameo-cut French and English pieces, and three Italian glass bird cages. The twentieth century is well represented by many great European and American names in art glass reproduction. Stained and leaded glass panels from the thirteenth to the sixteenth centuries include examples from Rheims Cathedral.

- o Fabrics: Woven, Printed, Embroidered. This large collection, which embraces a wide range of techniques, cultures, and periods, enjoys international recognition. An outstanding segment is a group of Egyptian, Islamic, Mediterranean, and Near Eastern textiles from the third through the fifteenth centuries. Another, of woven silks from Christian Europe of the fourteenth through the eighteenth centuries, is especially important. The collection of dyed fabrics is strong, comprising techniques from a wide variety of countries and periods, including Indian painted and dyed cottons that influenced the development of European fabric printing industries. Embroidery is well represented, particularly by a group of men's waistcoats in the high style of the eighteenth and early nineteenth centuries and a sizable collection of samplers. The collection of lace deserves attention for its extraordinary quality and design.

The collection is amplified by a large number of lace pattern books, dyers' and printers' notebooks, and merchants' sample books from the sixteenth century to the present, and by working drawings and proof

prints for a number of textiles in the collection. These components allow a study of textiles through an examination of pattern, color, structure, technique and historic and social values.

- o Furniture, Architectural Woodwork, and Hardware. The primary eighteenth-century French collection of wall panels, *trophées*, frames, doors, boxes, and architectural elements has no rival outside Paris. Indeed, together with related drawings, prints and hardware, it represents a body of visual information necessary to a study of eighteenth-century French design.

The furniture collection highlights structural and stylistic developments from the seventeenth century to the present. With few exceptions (principally Oriental objects for export) the pieces are Western European and American, and were acquired for their intrinsic aesthetic worth as well as for their craftsmanship and design. Not all the furniture is of wood; indeed, two examples worth singling out are a glass desk by Djo Bourgeois shown in the Paris Exposition of 1929 and a chromium steel and canvas chair by Marcel Breuer from the first production in 1927.

- o Goldsmiths' Work and Jewelry. A diverse selection of silver- and goldsmiths' work includes seventeenth- and eighteenth-century German presentation pieces, rococo examples from France, and a number of English works of the eighteenth and early nineteenth centuries. A collection of eighteenth- and early nineteenth-century snuff, patch, and comfit boxes contains an important early eighteenth-century French gold box with diamonds and rubies. Other silver, some of it peasant work, comes from China, Turkey, Russia, Scandinavia, Central Europe, Mexico, and the United States. The twentieth century is represented by several outstanding pieces from Austria, England, and America.

Jewelry has been acquired with a concern for design and variety rather than intrinsic worth. A wide range of materials is represented besides precious metals and stones, and there are examples from all over the world, from ancient times to the present. The strength of the collection is in European and American nineteenth century jewels, with articles by two of the most important goldsmiths of the century, the Castellani of Rome and Carlo Giuliano of London.

- o Library. Developed as a complementary expansion of the Museum's collections, the library provides the most comprehensive and readily accessible reference collection of design and decorative arts in New York. It also contains the most complete assemblage of books on the textile arts in America. Many of the reference books are rare, including a number of architecture books of the seventeenth and eighteenth centuries, early natural history books with hand-colored plates, books of festival decorations, catalogues of world's fairs, beginning with the Great Exhibition at the Crystal Palace in 1851, and a collection of auction sales catalogues spanning more than a hundred years.

An encyclopedic picture collection of well over a million and a half classified items, the George A Kubler collection of line cuts from

nineteenth-century periodicals, and specialized archives on color, pattern, materials, symbols, advertising, and other categories extend the usefulness of the library by providing visual material in quantity.

- o Metalwork -- Minor Metals. Encompassed in this grouping are a wide range of metals: iron, steel, copper, brass, bronze, and pewter. The largest collection is of Japanese sword guards, which demonstrate the fine metal craftsmanship of the Far East. There is an extensive group of European gilt bronze furniture mounts from the eighteenth century through the Empire, as well as English and American hardware. Several hundred examples of iron locks, keys, and other hardware of earlier periods make the collection overall an important documentary resource.

A small selection of wrought-iron objects contains an eighteenth-century balcony and two lantern brackets from Germany, and several overdoors and window grilles from France.

- o Miscellanea. Among the Museum's holdings are sand, tinsel, and feather pictures, bird cages, pressed flowers, straw-work boxes, valentines, candy Christmas tree ornaments, and examples of packaging and paper folding. These objects offer a human, informal way of viewing the past. In addition, the Museum now collects articles in synthetic materials.

A collection of theater designs and pre-cinema toys includes peep shows, sand toys, zoetropes, anamorphoses, and shadow puppets.

- o Wallpaper and Bandoxes. Superseded in quantity only by the specialist wallpaper museum in Kassel, West Germany, this collection covers the entire development of wall coverings from Spanish and Dutch tooled leather hangings to present day wallpapers and polyplastic coverings. Many documented fragments from specific American houses are included, as well as a large group of bandoxes covered with wallpaper. This comprehensive collection, containing over 6,000 examples, offers a reflection of styles and fluctuations of taste.

Each curatorial department has made an extensive study of its own collections and sub-collections as they relate to each other, to other collections in New York, to similar collections in the United States and to other Smithsonian collections. Judgments on additions to the collection are based on quality and suitability to the purpose of the Museum. Future collecting policy will be based on upgrading the quality of present collections, updating to include contemporary material, filling gaps, building on existing strengths and adding totally new areas that should be included in a national museum of design (advertising design, industrial design, architecture.)

FREER

The Freer Collection was given in trust to the Smithsonian Institution by Charles L. Freer of Detroit in a formal Deed of Gift executed on May 5, 1906. The Oriental collections include works of art from the Far East --- China, Japan, Korea and Tibet; and from the Near East --- Iran (Persia), Iraq, Syria, Asia Minor, Byzantium and Egypt. Some 8000 Oriental objects were included in the original Freer collection. In the half century since the Gallery opened, approximately 2000 more Oriental objects have been added by purchase, so that there are now 10,000. Briefly summarized, the Oriental collections are as follows:

China: Bronze, jade, carved bamboo, sculpture, painting, lacquer, pottery, calligraphy and porcelain.

Japan: Sculpture, painting, lacquer, pottery and porcelain, calligraphy and metalwork.

Korea: Painting, pottery and metalwork.

India: Sculpture, manuscripts and painting.

Iran (Persia): Manuscripts, metalwork, painting, pottery and sculpture.

Egypt and Syria: Sculpture, manuscripts, glass and metalwork.

Greek, Aramaic and Armenian Biblical manuscripts, early Christian painting, gold and crystal. The outstanding objects in this group are the fourth-fifth century manuscript of the Gospel according to the four Evangelists and a third century Greek (Egypt) papyrus manuscript of The Minor Prophets (in part) known respectively as Washington Manuscripts Nos. III and V.

The arts of the West are represented by the large collection of 1,189 works by James McNeill Whistler, which includes a great number of oils, watercolors, pastels, drawings, etchings, lithographs, and the Peacock Room; paintings by George deForest Brush, Thomas Wilmer Dewing, Childe Hassam, Winslow Homer, Gari Melchers, Willard Leroy Metcalf, John Francis Murphy, Charles Adams Platt, Albert Pinkham Ryder, John Singer Sargent, Joseph Lindon Smith, Abbott Handerson Thayer, Dwight William Tryon, and John Henry Twachtman; two sculptures by Augustus St. Gaudens, and a group of Pewabic pottery by Mary Chase Perry Stratton. By the terms of the Deed of Gift, the section of American arts is closed against further accessions.

In addition to the main Freer Collection there is an ever-growing Study Collection, consisting of objects that are not used for exhibition, but are kept in study rooms for use as comparative material, for laboratory analysis, and for the use of visiting scholars and students, as well as by the staff. The Study Collection consists mostly of shards of pottery and porcelain (now amounting to some 5,000) from known find-sites and, even better, from known kiln sites. There are many hundreds of shards from kiln sites in Japan and in Thailand, and Chinese porcelain shards from known find-sites all around the Indian Ocean from Indonesia to the coast of Africa. In addition, there is what may be the most complete collection of shards from Japanese kiln sites assembled outside of Japan. The Study Collection also includes many fragments of ancient Chinese ceremonial bronzes, as well as a small selection of Japanese woodblock prints.

It is anticipated that approximately 15 to 20 objects will be added to the Regular Collection annually, with additions also being made to the Study Collection.

The terms of the Freer bequest stipulate that objects in the collection cannot be borrowed, nor can they leave the building. Consequently, it is especially important that adequate storage facilities be available.

Supplementing the collection is the Library which now has approximately 25,000 titles, about half of which are in Oriental languages, mainly Chinese and Japanese. In addition to the books and periodicals, the Library houses some 30,000 slides and over 8,000 study photographs. It is planned to greatly expand this valuable tool for art historical research.

Related to both the Library and the Study Collection is the Herzfeld Archive. This consists of all the field notebooks, all the negatives, and all the drawings and plans of the late Ernst Herzfeld, who spent his lifetime as an archeologist in the Near East, and who stands as one of the renowned scholars in that field. The material was given to the Smithsonian Institution in 1946 by Herzfeld's sister with the provision that it be housed in the Freer Gallery of Art; supplementary materials were added in 1951 and 1952.

The basic goals of the Freer Gallery, as envisioned by the donor, Charles L. Freer, were clearly stated in the Deed of Gift. Mr. Freer stipulated that the Freer Gallery should be constructed and equipped with "special regard for the convenience of students and others desirous of an opportunity for uninterrupted study of the objects in the collection," and for "the encouragement of the study of civilizations of the Far East." Throughout more than fifty years the Gallery has been open to the public, successive directors of the Gallery have carried out the mandate of the founder.

Research: Most unusual, perhaps unique among art museums, is the Gallery's relationship with the University of Michigan. Mr. Freer's will included a bequest to that university with the stipulation that the income from the fund was to be used "to add to the knowledge and appreciation of Oriental art," and for other related purposes. The funds provide for Freer Fellowships awarded from time to time to graduate students at Michigan who want to spend an academic year at the Gallery writing their doctoral dissertations on material in the Freer collection. At the next level, Freer Scholarships provide for tuition and other expenses for graduate students on campus in Ann Arbor when they are deemed promising and demonstrate a need for financial help. Further, some of the fund is used to bring graduate students in Oriental art to Washington, D.C. at least once a year for visits to the Gallery where they can have firsthand contact with the objects.

Recipients of the Louise Wallace Hackney Scholarships and the American Council of Learned Societies Fellowship for Research on Chinese Painting regularly come to the Gallery to pursue their research.

Curatorial staff members also supervise the work of scholars who obtain Smithsonian Fellowships.

Students and scholars from American and foreign universities and museums regularly visit the Gallery to study the collections and to discuss research topics with the curatorial staff. During the course of these discussions, students and scholars usually profit from studying the folder sheet files which update and record comments made by visiting scholars during the 50-year

history of the Gallery. These folder files present a clear, concise form of all the information currently available about every object in the Freer collection. The files are constantly being updated by members of the curatorial staff whenever new information becomes available. The folder files and the information they contain may be studied, on request, by scholars, students and the general public, thereby providing clear insights into the Freer collection.

Lectures: The Gallery lecture series is currently in its 24th year. Each season, seven distinguished scholars speak at the Gallery on topics relating to areas represented in the Freer collection. Attendance is free. Members of the Freer curatorial staff lecture at the Gallery or at educational or governmental institutions in the Washington area as well as throughout the United States and abroad. These lectures range from general surveys of the art of a particular period to those that are extremely detailed and specialized reflecting the current research upon which the curator might be engaged.

Examination of Objects: Curatorial staff members examine objects for the public, by appointment, on Tuesday of each week during the months from September through May. The number of objects examined by Freer curators each year is approximately 8,100.

In addition, curators reply to written requests for information about objects relating to those cultures encompassed by the collection.

Gallery tours: Daily tours are given on Monday through Friday at 2:30 p.m. Groups may request special tours of the exhibition galleries or study areas at other times.

Publications: The Freer Gallery of Art Oriental Studies series began soon after the Gallery opened in 1923. These are major monographs devoted to various phases of the collection written both by staff members and by invited scholars. A second, somewhat smaller and more informal series, The Freer Gallery of Art Occasional Papers, was started in 1947. This series takes shorter studies of material in the collection or of related material outside the Freer Gallery written by staff members or by invited scholars involving objects in the Freer Gallery as part of the study.

To mark the Gallery's 50th anniversary in 1973, the curatorial staff prepared three catalogues of special exhibitions of Freer objects. A series of color slides accompanies each volume.

With publication of the first volume of a Gallery handbook in 1976, the Gallery also established a special publication fund. It is hoped that future publications can be supported, in part, from that fund.

Sets of teaching slides illustrating examples of Chinese and Japanese ceramics in the collection have been prepared for use by museums and universities. Postcards, color reproductions, reproductions in the round and photographs and slides of Freer objects are available at the Sales Desk. The facilities of the photographic department at the Freer Gallery are such that requests for photographs, slides or color transparencies may be filled with the least delay.

Charles Lang Freer Medal: This medal, regarded as one of the most esteemed awards in the field of Near and Far Eastern art history, was first presented on

February 25, 1956, in observance of the one-hundredth anniversary of the birth of Charles Lang Freer. In all, six scholars throughout the world have received the medal "for distinguished contribution to the knowledge and understanding of Oriental civilizations as reflected in their arts."

HMSG

That the Hirshhorn Museum and Sculpture Garden was intended, from its inception, to be strongly collection-oriented is evident from the 1966 Congressional hearings that led to its establishment.

Prior to 1966, there was no national museum devoted chiefly to maintaining a collection of contemporary art. The Congress, as early as 1938, had expressed its desire to see such a museum brought into being. For nearly thirty years, this desire was frustrated: by the advent of World War II, by periodic fiscal stringency and by the seemingly insuperable task of assembling, at a single stroke, the broadly representative collection of contemporary painting and sculpture that such a museum would require as a foundation and that the nation had theretofore failed to assemble.

When Joseph H. Hirshhorn offered his collection to the Smithsonian Institution, the Congress was presented with a singular opportunity to repair this failure. Testifying before the House of Representatives Subcommittee on Public Buildings and Grounds on June 15, 1966, Secretary Ripley emphasized this point:

Now we have this unparalleled opportunity. We have in effect been given a collection which has been assembled privately, as if we had been doing it all the time. Mr. Hirshhorn has been buying contemporary art since 1923. The great development and interest in contemporary art which was recognized by the Congress in 1938 has been proceeding at a rapid pace ever since, with the result that it would be impossible for the Smithsonian or any agency of the Government to duplicate this collection for, perhaps, \$50 million.

We simply have been given something which someone else has been collecting as if we had been doing it ourselves, given the money. This is a fantastic advantage.

The legislation that was subsequently enacted, establishing the Museum and authorizing the funds required for its construction, maintenance and operation, specified the purposes for which its facilities were to be employed. They were to be "...the permanent home of the collections of art of Joseph H. Hirshhorn..." and were to "...be used for the storage, exhibition and study of works of art..."*

To ensure that the collection to be so housed, exhibited and studied would not be a static one, the Congress also established a Board of Trustees for the Museum and vested in it sole authority "...to purchase or otherwise acquire (whether by gift, exchange or other means) works of art..." for the Museum.

Since the Museum first opened to the public in 1974, the Trustees have -- building on the base of the original gifts donated by Mr. Hirshhorn and the Joseph H. Hirshhorn Foundation -- added some 236 works of art to its collection. These acquisitions have been made by (a) gift (including additional generous gifts from Mr. Hirshhorn, as well as some forty other donors), (b) purchase (largely out of funds annually appropriated for this purpose by the Congress, but with certain trust funds as well), and (c) exchange. Annual acquisitions have been as follows:

1974	21 Works of Art
1975	28 Works of Art
1976	109 Works of Art**
1977	78 Works of Art***

* Public Law 89-788, approved November 7, 1966

** Included in the 1976 total is one gift of sixty small drawings by a single artist totaling, in bulk, the contents of a medium-sized manila envelope.

*** To and including June 30.

In making acquisitions, the Trustees have placed their primary emphasis on works of art created within the past ten years in order that the passage of time not dissipate the contemporary nature of the collection and so that the "fantastic advantage" to which the Secretary alluded in 1966 could be retained.

As of July 1, 1977, the Museum's collection consisted of 6,494 works of art, classified in the following categories:

Paintings	3,273
Sculptures	1,781
Drawings	996
Collages	47
Prints	293
Mechanical reproductions	12
Works of decorative art	89
Photographs	3

More than 90% of these are the work of nineteenth and twentieth century American and European artists. The balance (all part of the original Hirshhorn gift) is contained in several sub-collections of Pre-Columbian sculpture, Benin bronzes, Eskimo carvings and Egyptian classical antiquities.

In its day-to-day use of the collection, the Museum's chief emphasis is on two of the activities referred to in its establishing legislation: exhibition and study. In practice, these are often interrelated.

Thus, for example, on May 24, 1977, the Museum opened an exhibition that included virtually its entire holdings of the work of the American nineteenth

century painter Thomas Eakins -- a collection considered one of the most important -- of the works of this artist anywhere in the world. The 240 page catalogue that accompanied this exhibition -- widely hailed as a significant contribution to Eakins scholarship -- was nearly three years in preparation. Under the supervision of the Museum's curatorial staff, substantial portions of the underlying research was undertaken by graduate students of American art history at the University of Delaware.

In the view of the Museum's staff, such interrelated uses produce multiple benefits: for the general public -- which has an opportunity to see, in a coherent context, a large number of works of art never before exhibited together; for the scholarly community -- which, through the Museum's publication program, has been able to assimilate the knowledge gathered in preparation for this exhibition to what is already known of this artist and his work; and for students -- who are given the all too rare opportunity to do original art historical research working directly with source materials.

Beyond such immediate use for exhibition and study within the Museum, the collection also serves as a resource for other institutions at both the national and international levels. In just the first six months of 1977, for example, collection items were loaned for special exhibitions to more than thirty other institutions: to museums in such cities as New York, Houston, Indianapolis, Chicago, Providence and Washington, and, in overseas loans, to museums in France, Switzerland, England, Japan and West Germany. Commencing in the Fall of 1977, the Museum will circulate a special exhibition of sculpture and drawings -- selected entirely from its own collection -- to a group of three South Carolina

art museums. A 1978 exhibition drawn from the Museum's holdings of paintings by Louis Elshemius will be specifically designed to travel nationally during 1979 under the auspices of the Smithsonian Institution Traveling Exhibition Service (SITES).

This commitment to a broadened use of the collection extends as well to the design of the storage facilities. In particular, the Museum's 19,500 square foot fourth floor painting storeroom has been specifically arranged as a study-storage area where interested students, critics and visiting scholars may have supervised access to those portions of the painting collection that are not currently on public display. Limited study access to the stored sculpture collection and the stored print and drawing collection is also permitted from time to time.

Further, in cooperation with the Smithsonian Institution's Office of Academic Studies, the Museum has arranged to provide temporary space for Smithsonian Fellows whose focus of interest embraces material in the collection. Within the past year, scholars researching the work of Philip Evergood and Arthur B. Carles -- two twentieth century American painters in whose work the Museum is particularly rich -- have been accommodated at the Museum. On August 18, 1977, the Museum opened to the public an exhibition of its Carles holdings, accompanied by a publication prepared by one of the Fellows and based largely on research conducted at the Museum.

The collection also serves, of course, as the principal focus of ongoing staff research directed toward developing the Museum's archival records. While some of this research may serve as a basis for future exhibitions, its larger

purpose is scholarly: to document as fully as possible the works of art in the collection and to share the resulting knowledge with other museums and with scholars and students throughout the world.

Concurrent with all these uses is the employment of the collection for general exhibition purposes. At any given time, the larger part of the Museum's gallery and outdoor display areas -- the Plaza and Sculpture Garden -- are installed with selections from the permanent collection. Increasingly, these are shown in so-called "exhibition units" -- in essence, mini-exhibits of a particular artist, period, theme or style -- which permit the rotation of the works on view without violence to any larger installation plan. This constant public availability of the collection has permitted the nearly five million visitors who have visited the Museum since its opening in 1974 to see important examples of the art of the past century displayed under ideal museum conditions. For those who want no more than the immediate experience of confronting these works of art by themselves, the Museum provides a sympathetic environment. For those who do want more, the Museum amplifies these displays with docent-guided tours, printed leaflets, electronic self-guided tours, films and lectures.

NASM

General

For many years, long before man first flew in 1783, flight formed an important part of our cultural heritage. Early people, in all parts of the world, in various religions and mythologies, attributed the capability of flight to their gods. This fascination with flight in all of its aspects -- past, present, and future -- continues to this day.

The National Air and Space Museum (NASM), in common with the other bureaus of the Smithsonian Institution, has as its primary mission the increase and diffusion of knowledge. In NASM's case, this knowledge consists of the history, technology, and, in some cases, the sciences of aeronautics and astronautics.

The increase of knowledge section of NASM's mission is met by the collecting of artifacts and material relating to those artifacts; by the collecting of historical and biographical material related to all phases of flight; by historical research; and by participating in scientific research projects run by other agencies such as NASA.

This collected knowledge is diffused throughout the country, and indeed throughout the world, in many forms. The most visible of these forms are the exhibits in the NASM building. Here an outstanding collection of aircraft and spacecraft is displayed with supporting material including modern and innovative audiovisual aids to present the story of air and space flight to the public. An auxiliary museum at Silver Hill, Maryland, allows display, in a simple format, of

additional groups of air and space craft. A vigorous loan program provides aircraft and spacecraft to other museums in the U.S. and abroad. The results of research by the NASM staff are published in books, journals, and magazines. The research files are used to answer requests for information and by outside researchers for reference. NASM also has worked with the Smithsonian Institution Traveling Exhibition Service in the preparation of exhibits. NASM works closely with schools and other groups to provide pre-tour information, guided tours, and post-tour information. As part of this program, a series of educational film strips on air and space subjects is being prepared.

The Collection

The NASM Collection consists of 262 aircraft; 377 engines; 406 propellers; 1069 aircraft models; 794 major items of astronautical hardware (spacecraft, missiles, rocket motors, etc.); 280 astronautical models; 1500 pieces of art including paintings, drawings and sculpture. In addition, the Collection contains more than 20,000 miscellaneous items including aircraft instruments, uniforms, medals, wings, astronautical equipment, pressure suits, trophies and assorted memorabilia.

The aircraft collection has a few important gaps that NASM is attempting to fill. There are other gaps that will never be filled as no specimens exist. Despite this, the collection is probably the most comprehensive in existence, including such aircraft as the Wright Flyer, first successful airplane; the Ryan NYP Spirit of St. Louis, used by Lindbergh for the first solo flight across the Atlantic; the Douglas World Cruiser Chicago, first airplane to fly around the world; the Bell X-1, first airplane to exceed the speed of sound; and the B-29 Enola Gay, the airplane that dropped the first atomic bomb.

The spacecraft collection is very complete because of the NASA artifact agreement under which all NASA space vehicles are made available to NASM. It includes Freedom 7, in which Alan Shepard made the first U.S. spaceflight; Friendship 7, in which John Glenn became the first American to orbit the earth; Gemini 4, from which Ed White made the first walk in space; and the Apollo 11 Command Module that carried Armstrong, Aldrin and Collins to the moon.

The scientific collections of the NASM consist primarily of lunar photographs, satellite photographs of earth, and the supporting data and documentation. This is the most comprehensive collection of its type in existence.

The art collection includes flat art, sculptures, and objects d'art pertaining to both atmospheric and space flight. The space art collection is very good and quite extensive. Most of it was transferred to NASM from NASA. The aviation art collection is not only much smaller, but of a much lower overall quality. It is, however, augmented by art borrowed from the Air Force and other collections.

The remainder of the collection, and by far the largest numerically, includes supporting material such as engines, propellers, rocket motors, space suits, uniforms, medals, instruments, parachutes, and flight clothing.

The research files include aviation and space photos, aircraft construction drawings, biographical and historical material, technical manuals, and general aeronautical and astronautical information.

The NASM Library has an extensive collection of books, journals, and magazines of the historical and technological aspects of air and space flight. A feature of the Library is the Ramsey Memorial Room, in which rare and scarce books, letters, and documents are stored. One of its treasures is a book signed by Pilatre de Rozier, who piloted the Montgolfier balloon in the first manned flight in history.

Use of the Collection

The NASM collections support three basic categories --- scientific, technological, and historical. Scientific research is supported by the collection of lunar photos, satellite earth photos, and supporting data. Members of the NASM staff use this material to provide accurate lunar cartography and for published studies of various lunar geographical features. The material is also used for reference by scientific groups from NASA and other agencies.

Technological support is provided to constructors of aircraft, both full sized and model. NASM restores its air and space craft to their original configurations with great accuracy and attention to detail. These restorations, besides being used for display, assure the preservation of the technology and are available to other researchers for study. The Tech Order files, aircraft drawings, and photographs are invaluable to the staff and to outside researchers. NASM has the complete drawing files for Waco, Stearman, and Ryan aircraft, which are very popular with the homebuilders and reconstructors. Also, NASM maintains a file of model aircraft drawings which are sold at a nominal cost. The entire collection, including air and space craft engines, equipment, associated memorabilia, photos and documentation is regularly researched by historians. Hobbyists, aviation and

space buffs, journalists, Federal Agencies, patent attorneys, and commercial aviation businessmen make wide use of our photo and drawing files and are permitted to photograph and measure minute details of some of the air and space craft.

The general public's main contact with the collection is through the exhibit program. At the present time, several hundred major air and space artifacts are on exhibit in the NASM building and at Silver Hill. The NASM building had almost 10,000,000 visitors during its first year of operation.

Many of the NASM publications deal directly with articles in the collection or with subjects related to the collection.

NASM is regularly visited by school groups who, we hope, obtain some air and space education during their visits. Pre-visit packages are prepared by our education department for distribution to schools. Docents are also provided to lead these groups.

The Library and NASM staff also respond to a large number of informational requests from schools and individuals. In many cases, these are answered by pamphlets which have been prepared on some of the more popular subjects.

NCFA

Collecting Art was included as one of the functions of the Smithsonian from the beginning. The collections from the National Institute, founded in 1840, were added to the Smithsonian holdings in 1862. With the Smithsonian becoming the recipient for art donated to the government, the Smithsonian art collections were designated in 1906 as the National Gallery of Art. In 1937 this bureau became the National Collection of Fine Arts. It is important to review these facts in examining the museum's collections.

By tradition as well as by mandate, the NCFA collects art of the United States of both the past and present. The collections consist of over 20,000 items. While this figure includes many fine examples of European and Asian art from the National Gallery period, by far the largest portion is of American work. There are about 4,000 paintings, 1,200 sculptures, 12,000 works on paper and the remainder in decorative arts. Thousands of items have been transferred from its collection to other bureaus when such transactions make possible a better management of the collections. For example, 8,000 engraving portraits were transferred to the National Portrait Gallery in 1964. In 1958 and 1959 the Reverend Alfred Duan Pell collection of about 1,200 plus approximately 200 other pieces were transferred to NMHT. These were decorative art objects primarily of ceramics, glass, and enamels. Earlier 41 items were transferred to Ethnology in NMNH. Another large group of several pieces from the Adams-Clement collection were transferred to NMHT during its founding years.

Outstanding collections within the NCFA

The collection contains not only the outstanding masters of American art, but it also has important holdings by lesser known artists whose works must be studied in order to comprehend the scope of our art.

The Harriet Lane Johnson collection accessioned in 1906 consists of 29 pieces of American and European art. The William T. Evans collection, accessioned in 1907 consists of over 100 pieces, outstanding among these are American impressionists, particularly rich in late 19th century American art.

The John Gellatly collection was accessioned in 1929. It includes over 300 important works of art, plus many pieces of decorative arts. Outstanding in the collection are paintings by Abbott Thayer, Thomas Dewing and 17 paintings by Albert Pinkman Ryder, the largest and most complete collection in existence.

In contemporary art, International Business Machines transferred over 100 works in 1966. In 1971 the Museum of Modern Art transferred almost 100 pieces of art executed for the Works Progress Administration and since then the General Services Administration has transferred over 1,000. The most significant single collection to come into the collection in recent years was the S.C. Johnson and Sons, Inc., collection of over 100 outstanding examples of contemporary painting.

With the transfer of over 400 Indian paintings by George Catlin, Charles Bird King and John Mix Stanley from the Museum of Natural History, the NCFA is the richest source of study of this subject.

This collection of art is the most complete coverage of American art on public view and covers important aspects that may often be ignored. For example, a special gallery is designed to display part of the collection of over 300 American miniatures. Every object in the collection is available for study, whether on view or in storage.

The Smithsonian has been developing collections in the several fields of history for over one hundred years. At first it was necessarily a very limited operation, undertaken with a small staff and negligible budget. Even through the 1930's and 1940's there were only ten or eleven history curators, most of whom had little or no formal training for their jobs. For the most part they collected well; the bulk of what they added to the museum we still have, and are glad to have.

In the 1950's there was an important change in the level of these activities. The Smithsonian stressed our need for special attention, and the Congress responded with authorization for a new museum and for the staff to operate it. The result was a surge of action that has manifested itself in a new generation of exhibits, in a series of scholarly publications, and in substantially increased collections.

The increased responsibility for collecting required closer attention to what we were doing. Staff development emphasized professionals with expertise in the primary collecting fields. Curators with graduate degrees in museum studies, in history, and in the history of science became more the rule than the exception. These were people who had a special understanding for the need to preserve three-dimensional documents of history, and each applied that understanding to the field of his responsibility. There was no formal directive telling what had to be done. It was assumed that each curator understood the needs and that adjustments could be made through established administrative processes.

By the early 1960's the curatorial staff had increased by a factor of four, with comparable increases in supporting staff and budget. One of the results -- as intended -- was a dramatic increase in the rate of collecting and, eventually, pressure on our storage facilities. As a consequence, we are now asked the extent to which we are intelligently managing our collections -- a reasonable question that may be answered through the responses to a series of subsidiary questions.

I. The process of making intelligent decisions about collecting

1. Goals of the Museum.

There is no formal statement of goals for this museum, although certain things are clearly understood. We collect, study, preserve, exhibit, and otherwise make available man-made objects which have historical value to our own culture (excluding art, air and space science and technology, which are collected by other Smithsonian museums). "Our own culture" is generally interpreted to mean that of this country. As a result, we have concentrated collecting on objects that were either made or used in the United States. Exceptions occur primarily in science and technology, where international influences are fundamental, and in philately and numismatics.

Virtually every nation in the world has responded to similar needs. From the oldest to the youngest, from the most primitive to the most advanced, there is a common feeling for the need to preserve physical evidence of the national heritage in a museum setting. It is a matter of pride. It is a

matter of deep-seated desire to know where we have been and to establish direct contact with our past through real objects.

Our collections are used in a variety of ways. A portion are exhibited, where they can be a source of inspiration, of education, and of entertainment to the public. Some objects may stay on exhibition for indefinite periods -- the Star Spangled Banner, the gunboat Philadelphia, the Model T Ford. But other exhibits -- celebrating the centennial of the telephone, or the bicentennial of the country, or the recent acquisition of some early plastics -- are changed periodically, lending a fresh face to the museum and showing off something of the depth of its holdings.

The collections are available for study, especially by historians who are increasingly becoming aware of the value of objects in the analysis of historical processes. These scholars include members of our own staff, pre- and post-doctoral fellows supported by the Institution for work here, and various others who come to use our holdings. Products of this research have appeared in Smithsonian publications as well as in historical journals and books.

The collections are also used by free-lance writers, by television, by the film industry and by government agencies in ways too numerous to mention. In each case care is taken to assure that such use is for non-commercial purposes.

Each use of the collections places demands on both the objects and the staff. The attitude of the museum has been to respond as positively as possible on the grounds that these are all legitimate uses of the objects within the goals set in collecting them.

2. Controls exercised in terms of museum goals

Much of what we do must be addressed to the problem of attacking a large and growing body of collectables with what is still a relatively small staff (the Science Museum in London, for instance, has a staff of science-technology curators approximately double ours). The need for efficiency is great. And since the curator plays such a critical role in the decision-making process, increasing attention has been paid to the initial selection of people for these positions. The universities, in recent years, have developed programs in museology, in material culture, and in the history of science and technology -- thus providing us with a pool of potential staff members. This has helped us considerably in our searches.

Once here, the new curator is encouraged to do historical research in the conviction that this activity is essential for responsible pursuit of the other duties. In order to acquaint the new curator with our objectives and processes, he or she is (under a new program) given special training and is exposed to many of the operations of the museum.

The curatorial position is usually subjected to two levels of supervisory control (Divisional and Departmental) plus the Director of the museum. Formal reviews of activity are made at least once a year, and informal discussions occur more often. These reviews explicitly cover collections activity, as indicated under the Civil Service Classification Standards in such terms as, "There is a continuing responsibility for the development and maintenance of a 'balanced' collection." Every three years, performance is considered by a peer group, the Professional Accomplishments Evaluation Committee, which considers these same factors and makes recommendations to the Director.

All major acquisitions must be justified and presented by the curator to a Collections Committee of staff members, which is also advisory to the Director. This process is designed to enhance the probability that collecting decisions will be in conformity with the basic museum goals.

3. "Endangered species"

On occasion an item becomes known only when it is about to disappear into oblivion. Opportunities are still missed, of course. Sometimes we don't learn about them until after the event, or the money is not available. It has, however, often been possible to act quickly when the need was perceived. For instance, significant early patent models were recently obtained at auction, political ephemera have been picked off the convention floor just ahead of the sweepers, and a highly significant 25-ton radio-frequency alternator rescued from a GAO excess property list, even when private funds were required for its transport. In most instances, the difficulty of responding with dispatch is not related to the decision process, but rather to money.

4. Adjustment to the work of other museums

All curators, as part of their professional expertise, are knowledgeable about other museums and collections in their fields. In some cases there is a healthy rivalry in the pursuit of material. But for the most part there is a

sense of cooperation in pursuit of a mutual goal. Small boats, for instance, which might reasonably be collected as part of a marine history activity, would in fact create considerable storage and maintenance problems; and since they are successfully collected by others, we are content to encourage them and to devote our energies elsewhere. A similar situation is found with respect to locomotives, although in this case a few representative examples are preserved for exhibition purposes. There are many examples of lending our experience and our artifacts to other museums, witness the example of time spent by one curator in helping to develop exhibits in the Oakland (California) Museum, or the objects that were sent from the electrical collections to various museums, some as far away as India. There are also some attempts at developing national artifact catalogues: one is a long-term, continuing project on a National Inventory of Scientific Instruments; another is a partially-completed project on medical instruments. Unfortunately, experience has shown that however laudable -- and useful -- such enterprises may be, they can be very time consuming and fraught with a variety of difficulties. They should not be undertaken without a clear understanding of their scope, of the amount of support needed, and of the probability of completion.

5. Disposal of what is not needed

There are means by which objects in the collections can be deaccessioned. These procedures are purposely made complex in order to assure that no hasty decisions are made which might result in the loss of a valuable specimen. The result is that the number of items disposed of in this manner is relatively

small. No systematic "weeding" of the collections has been attempted, because we have never had the required staff. A possible recommendation of this committee might be to suggest that a detailed examination of one collection be made on a trial basis to determine the actual work involved and the percent of objects that could be superfluous.

II. Preservation of the collections

In most instances an act of preservation has been made in simply taking a specimen into the museum's wing and removing it from the hazards of the regular environment. Unfortunately, this is not always true. Objects can meet with damage in a museum setting, and storage conditions, especially off the Mall, are not always ideal. Fully two-thirds (by volume) of the collections are presently housed in facilities at Silver Hill, Maryland, where there are wide temperature fluctuations and no humidity controls. Most of these objects are relatively unaffected by such conditions -- at least over the short run. But some are not, to their detriment. A recommendation of this committee might be to determine what percentage of these collections may be in real danger and to suggest what can be done about it.

Even within the museum building objects are not all stored in an optimum fashion. This is particularly true of textiles and costumes, some of which must be folded or layered because of crowded conditions.

Active steps are also taken to preserve an object. These, as a rule, are as simple as possible in order to minimize the chance of damage being done. Fumigation of certain materials is an obvious and virtually automatic step. Otherwise, simple cleaning is the most often applied remedy. In the long term, especially for metals, more extensive cleaning may be called for, followed by the application of a protective coating. An example of extensive preservation and restoration (returning an item to its original condition -- a procedure not always desired for museum specimens) is the work done by the Science and Technology Technical Laboratory for the 1876 Centennial exhibit. Twelve people spent almost two and a half years processing 171 requests (many of which included several objects) ranging from a 20-ton steam engine and ordnance guns of similar weight to tuning forks and telegraph instruments.

Expert advice in identifying problems and suggesting solutions is available to the museum through the Institution's Conservation Analytical Laboratory. But most of the actual work falls back on the laboratories and individuals associated with the departments and divisions. These embrace a wealth of experience, equipment, and expertise for handling everything from textiles and harpsichords to automobiles and electrical generators. A common complaint of curators, made in a recent survey, was that the amount of help available in the divisions for this type of work is inadequate and that as a result the collections must suffer in the long run. A recommendation of this committee might be that this problem should be considered in more detail and that a determination should be made on how best to handle active preservation methods.

III. Accessibility of the collections and of information about them.

1. The recording of data.

For historical reasons, connected with the differing needs of different collections, there is no single museum-wide catalog card. There is, however, a central registrar and registration system. Throughout the museum standard procedure calls for groups of items, received in the same transaction, to be given a single registration number after the necessary steps have been taken to transfer title. The registrar receives at the least a list of objects included. Additional information may be added to the registrar's file, including background correspondence and detailed descriptive material. The objects themselves are given individual catalog numbers, and they are described for the catalog files of the division. Usually these files provide for cross-indexes (by subject, date, donor, maker, associated person, place of origin, etc.). The catalog cards may vary greatly in information content from one to another, even within the same division or the same subject area.

In general, cataloguing is kept current. There are, however, two or three large documentary and photographic collections which, contrary to usual policy, were accessioned in the same manner as objects. These should probably be removed from the registrar's roles and treated as documentary collections, where individual items are not ordinarily specifically identified. In addition, there are small packets of cataloguing backlogs, some a product of bicentennial activity, which are being cleared up.

One of the greatest needs in the museum is for improved card files (also an essential step prior to any computerization). Most curators point to the fact that support personnel for this work and other activities (secretaries, technicians and specialists), which was at a ratio considered low then of 2.2 per curator in 1966, dropped to 1.8 in 1976.

An important step has recently been taken in establishing a small team to conduct an inventory of collections, division by division, directed by the Office of the Registrar. This will give us for the first time an overall check upon our collections and our accession and catalog files.

2. Accessibility of the records

The central registration file provides information on all accessions. As indicated, the descriptive input from the divisions is likely to be limited, but additional papers are kept here, including correspondence pertinent to the original transfer, which are often quite revealing. An initial step has been made towards computerizing the registrar's files, but this has only been begun during the past two or three years, and is limited in the number of descriptors. This is, in fact, an enormous task, especially if previous accessions are to be included, and certainly if detailed information is to be added.

Principal catalog files are maintained by divisions, often with cross-indexes. Some divisions, notably in cultural history, have successfully used mechanical means for retrieving data using a relatively large number of cross-

indexes. Some beginnings have been made towards computerizing individual collections, notably with guns, microscopes and clocks. In each case a special effort was made and additional personnel were used. If computers are to be employed it is to be expected that a large initial expenditure of time and money will be necessary, presumably done by working on a small number of collections at any one time.

It should be noted that in spite of the lack of good mechanical retrieval systems, the catalogs are used effectively by a wide variety of people during the course of a year, including staff members, volunteer assistants, pre- and post-doctoral fellows, other students, patent searchers, donors, and a variety of others with legitimate purposes.

3. Accessibility of the collections

As mentioned above, one-third of the storage volume is located in the museum. This probably means that over half the objects are located here (even discounting coins and stamps), since the larger pieces are usually relegated to the Silver Hill facility. Most of these objects are shelved or otherwise stored in a manner that allows quick and easy access. The situation is being further improved by the installation of new units with glass doors which provide physical protection yet at the same time allow for visual inspection. This means that these collections are easily accessible to the staff and others, greatly improving their value for a variety of purposes. (This situation is in marked contrast to that in most large museums of similar subject matter.)

Objects at Silver Hill are of course less accessible, though even there efforts over the past few years have produced a great improvement.

IV. Growth of collections

As a supplement to data given elsewhere in this report, counts were made, from divisional records, of the number of items collected by the Department of Science and Technology and by the Division of Cultural History (adjusting in each case to the composition of 1976). The results -- reproduced on the next page -- show a break occurring in the mid 1950's with the development of the new msueum and the hiring of new personnel for it. Furthermore, and of special importance, the curves before and after the break are in the form of straight lines. Data for the entire museum were also plotted, and similar results were obtained. It is important to note that support for the msueum -- especially in terms of curatorial staff positions -- was relatively constant before and after the break: ten or twelve curators over the two or three decades before the break, and about 42 soon after. The implication is very strong that, on the average, a given number of curators will collect a certain number of items over the course of a year. It also implies that the museum is not becoming saturated, that the staff feels there are still many things worth collecting. One reason for this is that collectables are continually being produced, in the form of political campaign memorabilia, new electronic devices, new designs for home furnishings. But there is the additional factor that the old areas are far from being exhausted. Conversations with curators during the course of this study revealed that in some areas where intense collecting had occurred

in the past they were being very selective and accepting only a few needed items; but at the same time they were turning to new areas that had suffered relative neglect. Thus, in Costume, attention is turning from ready-wear to designer clothes, in Physics from particle accelerators to cryogenics, in Graphic Arts from presses to type-setting and foundry equipment.

Given the present staff, it is therefore reasonable to expect collections to increase linearly at least through the end of the century (an estimate also confirmed by conversations with curators). In terms of decision-making processes there seems no problem in anticipating that this expected level of activity can be handled intelligently: there are clearly objects that should be in the msueum and are available for collection, the staff is becoming more capable, and the review processes are set and have proven workable. Focus, therefore, should be directed towards the treatment of the objects after they arrive in the museums. Problems that already exist in the cataloguing and preserving (especially storage) of specimens can only become more aggravated. Since it would seem self-defeating to the purpose of the museum to limit artificially the collecting activity, it is clear that attention needs to be paid to the solution of these other twin problems.

Introduction

The collections in the National Museum of Natural History encompass the entire scope of natural history in its broad sense; the structure and development of the earth and other bodies in the solar system; the origin, evolution and diversity of life on earth; and the origin and development of mankind and human cultures.

These collections are distributed among seven research departments: Anthropology (including specimens in physical anthropology, archeology and ethnology); Botany; Entomology; Invertebrate Zoology; Mineral Sciences; Paleobiology (fossil organisms including both plants and animals); and Vertebrate Zoology.

Although local museums of natural history are expected to cover only the biology, geology, and anthropology of their region, the National Museum must be national and international in its scope. Our collections should adequately cover all fields, but we have not progressed to that point yet. In paleontology we are strong in invertebrate fossils of the U.S., but very weak in comparative material from western Europe and Asia. Our collection of fossil foraminifera, used extensively in the search for petroleum, is the most important in the world, as is our collection of trilobites. However, we lack good collections from certain parts of the geologic rock record, and our coverage of some important groups of organisms such as fish and ammonites is inadequate.

In botany, our collections of tropical American and eastern Pacific seed-bearing plants are the best in the world, and those of ferns, grasses, and woods rank among the top two or three in the world. However, some other kinds of tropical plants are inadequately known taxonomically and as a result this collection is actively growing. Among the invertebrates our collections of corals, worms, mollusks and echinoderms are excellent but we are very weak in collections of hydrocorals, ascidians and pterobranchs are nearly static. We must expand these weak collections

in order to make them more useful, and in the hiring of new scientists we will seek specialists in those fields in order to insure the needed growth.

Our anthropological collections are very strong in American Indian material, so much so that we have been turning down collections offered to us. Last year a major collection of Eskimo artifacts became available to us but we suggested that the material be kept in Alaska so that both the Eskimos and others could use it there. Our South American archeology collection is one of the best but our classical archeology collections are very weak, and this lack of specimens has hampered our efforts this year to build an exhibit hall depicting the history of the rise of Western Civilization.

Our mineral, rock, and meteorite collections are excellent and little growth will be necessary although the current extensive search for mineral resources requires us to include material found in these searches.

Table 1 gives a more detailed breakdown of the contents of the collections as of 1971, the last year for which comprehensive data are currently available.

History

Since its inception the Smithsonian Institution has grown in response to the needs of science and of the nation. From its modest beginnings almost one and one-half centuries ago, the Institution has become one of the world's foremost research organizations. Its first Secretary, Joseph Henry, recognized the financial and physical limitations that confronted the infant institution, but also recognized the necessity of collecting, preserving and describing the various aspects of the natural history of a virtually unexplored continent. The Congress certainly appreciated the need for preserving the objects acquired by the various departments of the Federal Government, and in establishing the Smithsonian provided that "all

Table 1

Specimens in the National Collections-May 1, 1971

	<u>Totals</u>
Department of Anthropology:	
Archeology	847,297
Ethnology	198,922
Physical Anthropology	<u>38,333</u>
TOTALS	1,084,552
Department of Botany:	3,476,481
Department of Entomology:	
Total in former Division of Insects, 1963	15,978,513
Totals for new divisions, since 1963:	
Coleoptera	941,008
Hemiptera and Hymenoptera	722,806
Lepidoptera and Diptera	749,628
Myriapoda and Arachnida	497,401
Neuropteroids	<u>467,879</u>
TOTALS	19,339,235
Department of Invertebrate Zoology:	
Crustacea	1,674,774
Echinoderms	115,265
Mollusks	10,192,618
Worms	<u>813,317</u>
TOTALS	12,795,974
Department of Mineral Sciences:	
Meteorites	14,000
Mineralogy	173,253
Petrology and Volcanology	<u>306,546</u>
TOTALS	493,899
Department of Paleobiology:	
Invertebrate Paleontology	13,579,129
Vertebrate Paleontology	59,340
Paleobotany	6,726
Sedimentology	<u>1,908</u>
TOTALS	13,647,103
Department of Vertebrate Zoology:	
Birds	539,767
Fishes	2,225,800
Mammals	437,389
Reptiles and Amphibians	<u>175,453</u>
TOTALS	3,378,399
GRAND TOTAL	54,215,643

objects of art and of foreign and curious research, and all objects of natural history, plants, and geological and mineralogical specimens belonging to or hereafter to belong to the United States, which may be in the city of Washington, in whosoever custody the same may be, shall be delivered to such persons as may be authorized by the Board of Regents to receive them." (Fourth Annual Report, P. 20)

The activities of federally supported surveys and expeditions, and of agencies such as the Geological Survey and the Fish Commission resulted in priceless additions to the museum and created a pressing need for increased research. It became clear that the Smithsonian could not ignore the need for a general museum, and the National Museum was established as a separate entity in 1874.

Detailed knowledge of the flora, fauna and geology of our continent was needed during the early rapid growth of the nation in order to support the fullest exploitation of our seemingly inexhaustible natural resources. Today we can recognize the effects of the ensuing over-exploitation and contamination of the environment created by a rapidly expanding population, and can appreciate the importance of a complete understanding of the natural system of which we are a part. Now as never before we need the information contained in collections of natural history, and now as never before we need to preserve the vanishing traces of our predecessors on this continent and of past cultures and civilizations everywhere.

Today the National Museum of Natural History is one of the five or six major world centers of basic research in the natural sciences. Its collections, assembled over more than a century, rank among the most important research resources in the world and in many specialties are unequalled. The scientific staff numbers 118 internationally recognized specialists who daily make use of the collections under their care for a variety of purposes ranging from routine confirmation of identification

to highly original fundamental research on special subjects. Through their scientific activities and professional relationships with colleagues around the world, valuable new material frequently becomes available to the museum. In the light of their intimate knowledge of their specialties, they apply an appropriate set of criteria to all potential additions to the collections and select for accessioning those specimens that will materially enhance the scientific value of the collection as a whole.

Importance of the Collections

Objects--natural and artifactual--are the objective basis of our knowledge of the earth and its inhabitants, including man and his development, diversity, and cultures. All studies of the physical and natural world depend upon these objects, and one of the primary functions of a museum is to preserve them for present and future research and education, and as a record of human knowledge and achievement. Owing to the prestigious position that the Smithsonian Institution early came to occupy in many fields of knowledge, as well as to the high qualifications of its professional staff, its Natural History museum has attracted many collections of outstanding scientific significance. These collections serve many purposes:

1. They are the basis for scientific research on the nature, relationships, origin and development of plants, animals, man and his cultures; and on the origin, formation and structure of the earth and its extraterrestrial neighbors.
2. They form, through the biological type-collections, a systematic "bureau of standards" whereby the precise identity of each kind of plant and animal described in the scientific literature is objectively defined and documented and permanently maintained in the interests of

worldwide scientific stability.

3. They provide a scientific record of the flora and fauna that inhabits, and has inhabited, diverse parts of this earth; they document the natural biotic assemblages that occurred in many parts of this and other continents prior to their alteration, disruption, and in some cases total destruction through human activities, natural catastrophes and adjustments through geological time; and they record and document such assemblages in areas today threatened by expanding human intervention that inevitably will irreversibly alter or completely destroy the natural environment.
4. They provide scientific documentation for many kinds of experimental research relative to the natural environment conducted by scientists and research organizations throughout the nation.
5. Archeological and ethnological collections attest to the origin, development, and persistence of different cultures, to the rates of change in these cultures, and to the characteristics of particular cultures at different periods in history.
6. They provide a most effective tool for the training of coming generations of scientists, and, through related museum educational programs, for informing the general public about the world's endangered natural heritage and shrinking resources.

Use of the Collections for Environmental and Pollution Studies

The increasing awareness of the extent to which man is polluting and destroying the environment, as well as merely altering it, has resulted in many current environmental studies. Proposed new land usage, development, and commercial exploitation must now be preceded by scientifically sound environmental impact studies. Their

preparation usually requires the use of systematic collections and in turn often generate collections of a supportive or "voucher" character. It is part of the scientific obligation of the Museum to maintain collections that are useful for such studies, and to preserve for future use and possible re-analysis the best voucher collections made during those studies.

Collections of this kind, depending upon their scope, comprise the base-line data against which environmental changes can be evaluated in the future. Even the old collections, made long before such considerations were anticipated, now provide many kinds of base-line data. They show us what kinds of organisms lived where, and this, in turn, reveals something of their original ecology. They can tell us something about the levels of some (but by no means all) of the pollutants that were present at the time of collection, for comparison with existing conditions.

We can already point to far too many areas damaged beyond reclamation by the effluvia of development, areas irretrievably lost to any activity by waste disposal. The Potomac River, lapping at Washington's doorstep, is an example that is rapidly approaching this stage. Other areas have passed the point of no return and may never be reclaimed so long as human activity persists. If such areas lack a foundation of basic knowledge, it already is too late to make any statement about original conditions or the causes, directions and rates of deterioration.

The staggering contemporary problem of wisely managing our environment to ensure that human alterations do not irreparably disrupt natural balances cannot be solved without a detailed knowledge of the plants and animals, not only those directly affected by man's developments but also those seemingly remote from our influence. It is well known that it is impossible to disrupt the populations of one species without affecting many that are interdependent. The cornerstone of this

knowledge is a thorough understanding of the classification and relationships of the various species of plants and animals. Even though men of science have been striving toward such understanding for more than two millenia, methodically so for more than two centuries, it remains incomplete for most plant and animal groups and extremely fragmentary for many of them.

One of the major reasons that our knowledge of biological classification is incomplete is the inadequacy of samples available for scientific study. A reliable result can be obtained only if the material utilized is reasonably representative of the species being studied, over its whole geographical and morphological range. Therefore, the basic tool available to the systematic scientist is a comprehensive collection of specimens for study. The less material available for study, the less accurate and less useful that study is likely to be.

Use of the Collections for Basic Research

The principal users of the Museum's collections are scientists and scholars both from within the Smithsonian and from elsewhere. Because of the scope of the collections they are indispensable to specialists from throughout the nation and the world. A major need of visiting scientists is to compare their own specimens against the standards of the original type specimens. Another requirement is to study large suites of specimens to evaluate the extent and nature of geographical and individual variation and to clarify biogeographical distributions. Still another need is to examine specimens from specific geographical locations in order to investigate some special feature, such as breeding condition, or to search for developmental stages in adult specimens.

The history of research proves that no study, no matter how thorough, is ever complete. This is especially true in the biological sciences where we constantly

refine and expand the work done by our predecessors. So a thorough systematic study, modern in its time, inevitably will be refined in the future as technology improves, as knowledge on all fronts advances, as the various areas of the earth are more thoroughly explored, and such refinements depend basically upon the same materials that formed the foundations of previous investigations. As an obligation to future generations, we preserve as a record of our research, the hard objective facts--the specimens themselves--upon which the work was based. Without them, knowledge cannot advance further.

Use for Education

The study collections of the National Museum of Natural History form an invaluable source of research material for students both from this country and abroad who are working toward advanced degrees in all phases of systematic biology, earth sciences and anthropology. Today few academic institutions maintain research collections essential for this fundamental aspect of scholarly training, so many students find it necessary to work for substantial periods (up to a year, or even more) on the Museum's collections during the preparation of required theses and dissertations, in order to study adequate amounts of comparative and distributional material and to confirm taxonomic decisions by reference to original type-specimens.

Several members of the research staff are adjunct faculty members at various universities and from time to time direct the thesis research of candidates for advanced degrees. Students working under these curator/professors make even greater use of the research collections, often studying material collected in the course of official museum programs and occasionally participating in the field work during which specimens are acquired. In this way, graduate students are trained in sound museological techniques, learn good research and field methods in actual

practice, and have access to one of the world's major study collections. The collections benefit from the original research and thorough curatorial care that results from supervised student use, and the students benefit from the scope of material and scientific expertise made available to them.

At lower levels of education (primary, secondary, undergraduate), classes make use of the exhibits maintained on public display, which consist of selected specimens from the Museum's permanent collections enhanced by explanatory text that can be elaborated upon further by class instructors or docent guides. College-level instructors may also conduct their classes on guided tours through various parts of the research departments, thus providing students with an introduction to the research purposes, activities and facilities of a major museum.

Photographs and drawings of specimens and graphic archival materials in all fields of natural history, but especially in anthropology and ethnology, are frequently reproduced in text books as well as popular books in the trade, with the effect that Smithsonian research collections serve a far wider educational purpose than is ordinarily realized.

Exhibits Use

Although comparatively few specimens out of the millions in the research collections are placed on public display, a selected few outstanding ones are, in order to demonstrate the various aspects of geology, biology and anthropology, explained in the exhibits. In addition, the conception and planning of exhibits of scientific topics is firmly based on knowledge derived from the research collections.

Uses by Industry

Qualified personnel in industry, such as biologists employed by environmental consultants, also may use the collections for confirming scientific identifications, determining the composition of the biota of a given area under study, or compiling the distribution of organisms of interest. Their usage of the research collections is always under the supervision of museum curatorial staff. It is similar to that of the staff, but is more comparative in nature rather than for original research.

This comparative use of the collections has been most important in recent years as an aid in the search for oil. The fossil remains of single-celled marine animals called Foraminifera are commonly found in the rock cuttings which come up in well drilling. The evolutionary and ecological distributions for these organisms were largely worked out by Joseph A. Cushman in the first 3 decades of the Twentieth Century, and this information was very important in the discovery of the oil fields of Texas, California, Oklahoma and the mid-continent region. The Cushman Collection is an important element in the Museum's collections and was used recently in the exploration for the Prudhoe Bay, Alaska oil fields. These collections, and many others like them, are in constant use for comparative purposes and have paid for their upkeep many times over in the benefits which have been derived from them.

Size of the Collections

The Museum's holdings now number nearly 60 million specimens and occupy some 373,000 square feet of space. This area is distributed as follows among the scientific disciplines:

Anthropology	65,600 square feet
Botany	37,000
Entomology	22,500
Invertebrate Zoology	47,500
Mineral Sciences	14,500
Paleobiology	77,700
Vertebrate Zoology	107,700

Details on rates of growth and sizes of individual collections are given later in this report.

Growth of the Collections

Rates of Growth

Growth of the collections is strictly controlled by the scientific staff who curate and use them and by the administration, and is partially offset by reappraisal of specimens and the disposal of those specimens that do not meet contemporary standards of research. Over the last 30 years, the collections have grown from approximately 17,500,000 specimens to about 58,000,000 specimens. The figures below show that the decade immediately following World War II was a time of exceptional growth, with relatively modest growth since that time.

1945-1955	Increase from 17,466,000 specimens; a 250% increase.
1955-1965	Increase from 42,000,000 to 49,000,000 specimens; a 16% increase.
1965-1975	Increase from 49,000,000 to 58,000,000 specimens; an increase of 18%.

In the last decade the Museum has grown each year at a rate of approximately 1.8 percent. For example, the average annual growth rate in the Department of Invertebrate Zoology over the last 30 years is 1.12%. In the Department of Entomology the collections have grown from 18,712,627 to 20,540,592 accessioned specimens from 1969 to 1975, for an average annual growth rate of 1.6%. The growth rate in the Department of Anthropology is estimated at less than 3% per year, with the bulk of growth occurring in the archeology collections.

On the basis of these statistics we predict that the Museum's collections will increase by some 12,700,000 specimens between 1975 and 1985.

On a national scale a growth rate 1-2% annually is projected for all natural history collections.¹

Reasons for Growth

The collections of natural history are both the basis for and the record of exploration and research done to increase human knowledge. As such, they form the objective foundation of knowledge in these fields of endeavor, and because our mission is the "increase and diffusion of knowledge" about a subject--the less we know the more rapidly the collections are likely to grow as more is learned.

In the general field of natural history the need to increase and diffuse knowledge makes it inevitable that the collections upon which knowledge is based must grow. Clearly, it is impossible to obtain a knowledge of the flora and fauna of the earth and their evolution without having representative specimens of plants, animals and fossils; we cannot obtain a knowledge of man's origins development and cultures without having representative specimens of human remains and human works;

¹

America's Systematics Collections: A National Plan. 1973. Published by the Association of Systematics Collections.

we cannot know the structure and formation of the earth without a collection of its building blocks, the rocks and minerals and sediments.

When Carolus Linnaeus published the 10th edition of his Systema Naturae, the cornerstone of the modern science of zoology, in 1758, he knew about 184 kinds of mammals; today, we recognize more than 5,000 kinds. Linnaeus knew about 554 kinds of birds in 1758, but today we know there are at least 8,600 kinds. Linnaeus knew 91 kinds of crustaceans in 1758, but today more than 25,000 kinds are known to science and every exploratory expedition shows that there remain many more to be discovered. Thus, to be an adequate research tool, a collection today must be many times as large as it was two hundred years ago.

Apart from knowing many more kinds of organisms today, we also have learned a great deal more about them, and this knowledge requires larger collections. For example, we have learned that many kinds of shrimps and crabs have a complex life cycle that involves several morphologically different stages which may differ as much from species to species as the adult animals do. Therefore, to understand the ontogeny of many species, as well as their interrelationships, we must know their various stages, and to do this we must have larger collections than were necessary when science was younger. We have learned that animals may vary morphologically from place to place, and may do so gradually along a geographical range to such an extent that individuals from the end points may differ so greatly that they look like separate species. To understand this phenomenon, to recognize clearly the limits of natural genetic species, and to understand variation as it relates to speciation and to environmental conditions, we need not just a few specimens of what we think to be the "typical" form, but instead a series of specimens taken over a geographical range to demonstrate the nature and extent of variation.

Even though we believe that we have now explored all the major parts of the world, there remain even in the 20th century many regions and localities about which we know little. As we explore these areas geographically and investigate their natural history, we find that we need still more collections to support this knowledge. A good example is the Antarctic, the fauna of which was virtually unknown until the early 20th century when adequate means of exploration were developed. For many years, crude collecting methods yielded only a relative handful of specimens from all the expeditions that ventured there. Even though an American was a pioneer Antarctic explorer, the Antarctic natural history collections in the Smithsonian occupied only a shelf or two (apart from the birds and mammals, always the first animals to attract scientific attention) until modern technology and increased interest made large scale investigations feasible. Operations of the U.S. Navy and the National Science Foundation have resulted in comprehensive collections of the flora, fauna and geology. Now the Smithsonian collections have grown many fold in this area, to the point where previous knowledge of the biota can be synthesized and modernized on a firm foundation.

Field Work as a Source of Growth

Collections in the broad field of natural history commonly are augmented through the field work of the members of the Museum's scientific staff. Not infrequently, research upon a subject of particular interest will demonstrate gaps in geographic or stratigraphic representation that must be filled before any meaningful conclusion can be drawn. In such a case, the scientist may arrange for field work in the pertinent area specifically to obtain the specimens he needs to complete his studies. Depending upon locality, subject matter and circumstances,

the curator may either limit his collecting to his own specialty, or collect and preserve other specimens as well. If the locality is a remote one, from which the Museum has little representation in general or which is in danger of loss or destruction through commercialization and which may not be visited again, it is likely that general collections will be made to augment Museum holdings in a variety of specialties. These "collections of opportunity" are extremely important and greatly contribute to the research potential of the Museum's collections in general. If, on the other hand, the locality is accessible, one from which general collections already exist, and the scientist's field work has a specific mission, only a certain category of specimens may be collected.

Gifts

One of the most important ways that the Museum's collections grow is through the gift of specimens from scientists, private collectors, and other institutions. The members of the Museum's scientific staff maintain a close and cooperative relationship with other researchers around the world. Because of this, and because the Museum offers the most stable depository in the U.S. for unique and irreplaceable research materials, many type-specimens as well as other material upon which research reports have been based are donated to the Museum upon the completion of investigations by scientists in other institutions. Specimens of this kind are the objective evidence for published research, much of which is of inestimable value in assessing the condition of our environment and formulating ways of managing it and interpreting the impact of evolution in a framework of geologic time.

Another source of gifts stems from the specimens which are submitted in a steady stream to the Museum staff for identification. In almost every case, the

consulting staff member is given the option of retaining selected specimens, if not all of them, for permanent deposit in the collection. Gifts of this kind are an important source of valuable material that could not otherwise be acquired by the Museum.

Because the Museum's staff scientists are recognized authorities in their research fields, they often are invited by other institutions to study and report upon important collections for which such institutions have no specialists of their own. As a courtesy in return for the scientific assistance of the collaborating specialists, the owner institution routinely presents a selected set of specimens to the Museum for permanent deposit in its research collections. As such collections commonly originate from major expeditions and collecting programs, the Museum thereby acquires a representation of foreign as well as privately collected American materials which enrich the depth and breadth of its collections and enhance their value as research tools of worldwide application.

Another significant way in which the Museum's collections grow is through the gift (or bequest) of research collections privately maintained by amateur collectors or by specialists working in non-museum institutions. In reciprocation for the assistance rendered by Museum staff and in recognition of the safety and security which the Museum can provide for the collections, such donors choose to give or will their working collections, often representative of a life time of research, to the Museum.

Purchase

Although purchase is a relatively small source of additions to the collections of the Museum when acquisitions are viewed over all, it may be an important source

for certain kinds of specimens. Items which have substantial intrinsic value, such as gems, minerals, and some fossils; or which have collector's value, such as seashells, butterflies or ethnological artifacts, fall into this category. For collections of these types purchase may be the only way to fill important gaps in the collections.

Transfers

Historically, one of the most important sources of new material in the general field of natural history has been through transfer from government agencies. Among these are the U.S. Fish Commission (now the National Marine Fisheries Service), the U.S. Coast and Geodetic Survey (now incorporated in N.O.A.A.), the U.S. Geological Survey, the U.S. Department of Agriculture, and the various armed forces.

Another form of transfer is from institutions which are no longer able to maintain collections which they have accumulated. Economic considerations have made it increasingly difficult for smaller repository institutions to survive, but the collections which they hold are sometimes of vital importance to Science. In such cases, the Museum has reluctantly but unavoidably had to take in these collections. The invertebrate collections from the University of Michigan Zoological Museum were turned over to the Museum several years ago, as was the entire collection from Wesleyan University. It is not unlikely that the Museum will be asked to assume responsibility for all, or parts, of other collections in the future if they are to be saved at all. Such transfers are not agreed to lightly, however. For example, the University of Virginia recently sought to have the Museum accept its excellent Seward Forest collections but the Museum did not accept.

Improvements in Science Technology

Another impetus for collection growth is improvement in the quality of science. New and improved instrumentation continues to make new studies possible and new studies more often than not require additional specimens. New instruments such as the transmission electron microscope, the scanning electron microscope, and the microprobe, as well as modifications of old ones, such as phase contrast microscopy and Nomarski interference microscopy, have provided new and more informative views of many kinds of natural history objects during the past few decades. New techniques of preparation, such as sectioning specimens by embedding in epoxy resins to observe the relationships of skeletal structures to soft tissues, have opened up whole new vistas of study. Inevitably, such developments create a need for additional material to study, and this means growth of collections: controlled and directed growth.

Improved methods of collecting also result in new collections. For example, the new technology that permitted drilling the deepest core ever made by man into a Pacific atoll resulted in new -- and priceless -- collections. So have refined methods and equipment for deep-sea dredging, which have enabled us to obtain specimens of animal life from the deepest trenches in the world ocean. Such collections may not be vast in volume but they represent growth nevertheless: controlled growth, essential growth.

In summary, increasing research requirements, the urgency of environmental considerations, our broadening obligations to future generations not only of scientists but also of the general public, and our rapidly advancing technology all generate new pressures for continued scientific collecting. The need to advance the forefront of knowledge continues, and this advance requires new collections.

Alternatives to Collections Growth

There is no satisfactory alternative to collection growth. When a scientific collection can no longer grow, research and the knowledge which flows from it will slow and eventually stop.

In the field of natural history, there is no alternative to studying actual specimens. Most of our collections are composed of animals and plants, no two of which are exactly alike. Among our goals in studying them is a thorough knowledge of their form and structure, and no reproduction of any kind can provide this. We also seek to understand variation--individual, geographic, environmental--and growth and development, and no reproductions can show these. When we study a specimen--plant, animal, fossil--we attempt to describe and depict it as fully as possible with the most sophisticated means available--but we still cannot dispose of the specimen and rely solely upon the written word and printed iconography; some features may be overlooked, others may not be visible with the instruments that we use, and additional study may become necessary in the future for verification, for amplification.

Control of Acquisitions in the National Museum of Natural History

The collections of plants, animals, fossils, rocks, and human artifacts housed at the National Museum of Natural History are a living body of information. They represent an accumulation of knowledge about the natural world which has been gathered by thousands of researchers over the last 150 years or so. The collections are in constant use by present day researchers, both from the Smithsonian and elsewhere, and are being selectively added to as new parts of the world are opened for investigation and as new habitats and organic relationships are explored.

The National Collections are both comprehensive in their coverage and extremely varied in detail, so that no single individual can reasonably judge what should be added or retained in such diverse collections. Therefore, over the years, the Museum has hired a staff of expert scientists, whose chief standing obligation is to maintain and improve the collections. It is necessary, in order to fulfill this function, that Museum scientists be very familiar with the state of knowledge within the subject matter area covered by the collections under their care.

Responsibility for the care of the collections has been delegated by the Secretary to the Director of the Museum. In the past the Director had given the scientific staff of the Museum considerable freedom as to the number and kinds of new specimens to be added to the collections. This was both necessary and desirable during the early days of intensive exploration of the natural environment. For example, we are particularly fortunate that aggressive collectors were on the scene during the days of westward expansion, else we would have lost a great deal of knowledge about the native peoples of America. However, because of the great increase in the number of curators in the Museum since 1955, and the rapidly increasing cost of maintenance and storage of the collections, it has become necessary for the Museum administration to be more involved in deciding what can be added to the collections. Involvement of management in collections decision-making has also been required in the increasing number of instances in which small university museum collections have been discontinued and the Museum has been asked to accept them.

The new policy involves both peer and administrative review of proposed new additions to the collections. It will always be true that the individual scientist-specialist will be in the best position to determine what should or should not be added to the collections under his care. However, it is not always the case that

each individual scientist has the needed Museumwide perspective to determine how space and other resources should be allocated to meet all current needs and to properly plan for future needs. In recognition of this situation the Director has established the following set of procedures for collections management within the National Museum of Natural History:

1. Each individual scientist is permitted to acquire on behalf of the Museum small numbers of specimens each year. These are ordinarily research materials gathered for immediate study. Some of these specimens may ultimately be discarded after research is completed. Such acquisitions are limited to less than 100 cubic feet per scientist per year.
2. Committees have been established within each of the scientific departments to consider large acquisitions. Each committee reviews every proposed or possible acquisition over this minimum level and recommends a course of action to the Departmental Chairman. The Chairman, based upon knowledge of the space resources available to the Department, makes the final decision for small to moderate sized collections. For larger collections the final decision is the Director's. In any case, the Chairman informs the Director of all decisions to house additional collections. In the case of truly large collections, such as might become available from another Museum which is closing its doors, the Director consults with and seeks guidance from the

Assistant Secretary for Science and the Secretary
of the Institution.

The collection management policy has been operational in the Department of Entomology for the last 4 years and in the Department of Anthropology for the last 2 years. It has been instituted in the remaining 5 scientific departments during the course of 1977 and is working very effectively.

As long as new knowledge is obtained from nature it will be necessary to increase the size of the collections which document this knowledge. The purpose of this policy is to cause the careful review of all acquisitions so as to assure that poor or unneeded specimens are not accepted. At the same time the controls are not meant to discourage growth of collections because there are many areas in which they should grow to fill existing gaps. In light of the variety and complexity of specialties in the natural sciences there is no doubt that the best judgment as to what should or should not be added to the collections is possessed by the individual scientific curators. In light of dwindling space and funding resources for the storage and maintenance of these collections, it is both necessary and appropriate that the individual judgments of the curators be reviewed by peer groups and science administrators so that the available resources are applied to the best advantage. The simple, straightforward procedures outlined here take into account these realities and provide a mechanism for the orderly control of the collections at the National Museum of Natural History.

Criteria for Selection, Rejection, and Disposal of Specimens

Accessions are never accepted as a matter of routine, nor without professional evaluation. The decision to accept or decline material offered to the Museum is based upon many considerations, which differ among the various departments and

among the diverse scientific fields. The chief criteria are as follows:

1. Scientific importance, which is determined by several factors including:
 - A. The specimens form the basis of published research; such as type specimens, voucher material supporting experimental or systematic studies.
 - B. Representation (both taxonomic, geographic and cultural) of similar specimens in the collection.
 - C. Rarity in general; replaceability.
 - D. Specimens required for studies in progress.
2. Quality of scientific documentation.
3. Physical condition and adequacy of preservation.
4. Logistic considerations: problems of transport to the museum, storability.

These criteria are not applied in any strict sequence, but are considered in the light of existing knowledge, the status of present collections, the nature of the object or objects under consideration, and all attendant circumstances. Even a common object may be highly desirable if it is a fine example in especially good condition, and an extremely rare object may be equally desirable even though it is in poor condition or is deficient in some other way. All factors must be taken into consideration and carefully balanced. The strict enforcement of arbitrary rules inevitably would lead to the exclusion of highly important specimens from the Smithsonian collections and would work to the disadvantage of science.

In the course of using a scientific collection for research, all the material of a given category--perhaps large, a genus or family; perhaps small, only a species or subspecies-- comes under detailed scrutiny, and in this process, any material that is defective and useless for research is detected. The scientist is then in a position to decide whether the interests of the collection and of

science are best served by discarding or retaining all or some of the defective specimens. However, relatively few items are removed from the collections because of the rigorous review given to the objects before they are admitted into the collections in the first place.

The formal procedure for disposal of large collections involves the scientific staff, the Departmental Chairman and the Director. The Chairman recommends to the Director that a Condemnation Committee be appointed. The Director then appoints a Condemnation Committee of at least three members, consisting of the Chairman of the Department involved and two curators who are to have special qualifications to make suitable recommendations for the disposal of such materials. This Committee examines the material concerned and submits a signed report. The Director then either approves or disapproves the recommendations of the Committee.

Small numbers of specimens can be disposed of at the discretion of the curator expert in that field.

Care of the Collections

Approximately half of the people and funds available to the Museum's seven scientific departments are used for collection care. Care is provided directly for the specimens, and also for the data which document the specimens. The specimens themselves must be preserved against breakage, loss, abuse, deterioration and even theft. The information about each specimen must be carefully maintained because without the data the specimen becomes nothing more than a curiosity.

According to their nature, specimens are stored either dry or in fluid, in appropriate containers housed in modular storage units. The individual specimen containers are filed in various ways depending upon their nature, the kind of

organism, the expertise of the scientific staff, and the status of knowledge of the subject matter. The system used in any specific collection is designed for the most efficient retrieval of specimens for that collection. Thus the 10,000 human skeletons in the collections are stored in geographic and ethnic categories whereas the 437,000 mammal specimens are stored by animal type (Genus and species).

Specimen documentation is an indispensable part of every collection. To the scientist, recorded data convey information which cannot be determined from the specimens themselves but which are essential to scientific studies. Collection managers must keep accurate records to properly organize and control the collections and to provide ready access to the specimens by scientists and the public, and museum administration needs collection documentation to assess overall collection maintenance and use. Recognizing the extreme value of specimen records, the Museum gives high priority to preparation and maintenance of adequate collection documentation.

Priority has been placed on using Automatic Data Processing (ADP) to help with the largest data handling job of the Museum--the documentation of newly accessioned or cataloged specimens. Instead of writing labels and catalog entries by hand, data are first put into machine-readable form by a variety of methods, and then automatic typewriters or the computer are used to print as many documents as needed. There are several advantages to this procedure: (1) A Computer data bank of all new specimen data is a valuable product of the process; (2) data need to be typed only once, reducing the chance of error and decreasing the amount of work needed to produce multiple documents; (3) several ADP methods for expanding outlined data can be used to greatly reduce the amount of typing needed to build the data bank; and (4) the computer data bank can be easily updated and revised documents produced when additional data come to hand later.

Some departments are using ADP to carry out a retrospective inventory of their more valuable collections. Automatic data expansion techniques can greatly reduce the amount of data recording and typing required to complete the initial canvass of the collection and to build the computer file. The data bank can then be sorted and listed in a variety of ways by the computer to help locate misfiled specimens and to detect errors such as mistyped catalog numbers. The data bank can also be used to plan reorganization of a collection, and it serves as a highly retrievable information source for users of the collection.

The Museum is also exploring the use of ADP to record and control the movements of specimens into and out of the Museum through new accessions, the movements of specimens into and out of the Museum through new accessions, exchanges, loans, transfers, etc.

Considerable progress has been made toward the formulation of a common information system for museums. The Smithsonian's ADP system, named SELGEM, has received wide acceptance among natural history museums and this has led to closer cooperation among them. The key subject of data standards is being widely discussed by several national organizations such as the Association of Systematics Collections, and it is apparent that efforts will be made to formalize some standards through the American National Standards Institute. Several years will be required before the full benefits of these efforts will be realized, however.

Another and more legal form of documentation for the Museum's specimens is provided by the Office of the Registrar. This office is responsible for maintaining records related to the accessioning of specimens coming into the Museum, the documentation of legal ownership of the collections, the transfer of specimens between museum departments, and the loan of specimens to other museums or academic institutions. With the exception of some records destroyed by fire in the 1860's,

the registrarial records of the Museum date back to 1834. Some idea of the magnitude of this operation may be gained from Table II, which records the specimen transactions of the Museum's Registrar for FY 1973.

Within the departments or divisions, more detailed cataloging records are kept relating to each specimen, usually through ADP procedures.

Table II

NATIONAL MUSEUM OF NATURAL HISTORY
Specimen Transactions for Fiscal Year 1973
(Office of the Registrar)

	New Accessions	Exchanged w/other Institutions	Transferred to other Gov't agencies	Received on loan	Lent for study	Identified
DEPARTMENTS						
ANTHROPOLOGY	66	15	0	0	275	1,200
BOTANY	224	33,304	275	8,598	38,256	0
ENTOMOLOGY	423	1,518	60	0	82,739	13,869
INVERTEBRATE ZOOLOGY	429	1,246	0	4,695	16,567	43,566
MINERAL SCIENCES	234	5,738	86	57	1,336	456
PALEOBIOLOGY	127	9,800	0	0	8,313	650
VERTEBRATE ZOOLOGY	172	3,344	0	3,262	10,805	42,681
	1,675	54,965	421	16,612	158,291	102,422

Summary

In summary, the collections of the National Museum of Natural History are a living reservoir of past and present knowledge, and a source of new information for the future. The maintenance of the collections and continuing provision for their growth is essential if they are to remain a vital resource for many kinds of studies and investigations. Selection of specimens to enter the collections is done carefully, using the expertise of the scientific staff.

NPG

The National Portrait Gallery's collections consist of painted and sculpted likenesses, as well as prints and photographs. Our principal concern is the significance of the subject, and our goal is to build a collection of portraits that is truly representative of the rich and diverse history of this nation.

In addition to using our collections for public display and for research about both the subjects and the artists of portraits, we also assure that they are preserved for future generations. We also provide services nationally, in terms of loans to exhibitions, consultation to museums and the public, publications based on our exhibitions and other research projects in the area of portraiture, and educational materials which can be used in the teaching of American history. We help identify the holdings of private citizens; we provide reference and illustrative materials to scholars and to the media; and we maintain archival data on important American portraits not in our collections both for our own research and to facilitate the research of others.

The exhibition policy of the National Portrait Gallery is to display likenesses of the "men and women who have made significant contributions to the history, development, and culture of the people of the United States." In order to fulfill this mandate in as thorough and balanced a manner as possible, considerably more public exhibition space than is presently available will inevitably be necessary.

Even at this relatively early stage in the existence of the Gallery, more than fifty portraits which should be on view cannot be shown. These works particularly must be stored in such a fashion as to be readily accessible to the public. To these requirements should be added the need to reserve a significant area for special temporary exhibitions consisting primarily of portraits borrowed from other sources.

In the past decade, as the staff and programs of the National Portrait Gallery have developed, upwards of 20,000 square feet of once used space has been turned over to display and collections management. We now use all available space. The following report analyzes the growth of the National Portrait Gallery's collections (described in Table I) and recommends some solutions to their storage and management needs in the years immediately ahead. In Table I of the 761 St. Memin engravings acquired in 1974, 108 have been included in the permanent collection, 653 in the study collection.

TABLE I. Description of Holdings

Permanent Collection	1,181
Study Collection	1,143
Associative Objects/ Decorative Arts	155
Patent Office Items	41
SUBTOTAL	<u>2,520</u>
Graphics Collection	<u>38,261</u>
TOTAL	<u>40,781</u>

When inventoried in 1969, the graphics file numbered 38,261, accumulated as follows: (Gifts of photograph collections, containing items useful for reference although not admissable to the permanent collection, could result in renewed growth.)

TABLE II. Graphics File

10,000	Robbins Collection (Arlington, Mass.)
8,000	Reed Collection duplicates (Metropolitan Museum of Art)
1,555	Library of Congress
14,000	MHT, Division of Political History
4,000	Harris and Ewing Studios
<u>706</u>	Miscellaneous Donors
38,261	Total

Associative and Decorative Arts Objects Collections have recently increased at a faster pace as greater emphasis has been placed on acquiring memorabilia related to notable figures. Two-thirds of the 155 items in these collections have been added since January 1974. Some of these (like Sully's female model, painters' easels, etc.) have bulk, although most are easily stored when not exhibited. The few pieces of furniture acquired are displayed in Gallery areas, and the forty-one patent office views (two-thirds of which are prints, the balance photographs) are also compactly stored.

Tables III-V indicate our permanent and study collection holdings and their growth according to media. Painting, sculpture and drawing collections have grown at a steady rate since 1966, whereas holdings in graphics and photographs have dramatically increased only in the past two years. (For the purpose of simplification, the storage needs of paintings, drawings, and sculpture, of concern primarily to the Registrar, will hereafter be referred to as General Storage.) Growth by media during the past two years is contrasted with that of the previous decade.

TABLE III. Current Permanent and Study Collections by Medium

Paintings	535
Sculpture	190
Drawings	215
Prints	1,243
Photographs	<u>141</u>
Total	2,324

TABLE IV. Average Annual Additions by Medium, 1966-1976

	<u>Permanent</u>	<u>Study</u>	<u>Total</u>
Paintings	32	9	41
Drawings	15	2	17
Sculpture	15	2	17
Graphics*	18	20	38
Photographs	<u>1</u>	<u>2</u>	<u>3</u>
Total	81	35	116

*Excluding the St. Memins. With them the chart would read:

Graphics	<u>29</u>	<u>84</u>	<u>113</u>
Total	92	99	191

TABLE V. Average Annual Additions by Medium 7/1975-7/1977

Paintings	18	1	19
Drawings	12	-	12
Sculpture	12	2	14
Graphics	64	36	100
Photographs*	<u>85</u>	<u>32</u>	<u>117</u>
Total	191	71	262

*(1976-1977 only, since curator hired after FY-76)

Note: During the past year 37 associative objects and 41 patent office items were added.

Growth Projection

Projections must take into account the pending acquisition of three special collections, especially the 1,040 original portraits for Time Magazine covers since 1957, to be donated this fall. Most of these portraits are paintings, many are large, and the total collection in effect will more than double our requirement for General Storage. (Time will subsequently contribute fifty original cover portraits annually.) A second collection consists of twenty-five Jo Davidson busts of 20th century Americans. This single gift will increase our holdings of sculpture by thirteen percent.

Finally, we expect to acquire a collection of 350 Auguste Edouart silhouettes. Combining these special gifts with our normal acquisitions (estimated at 350 items, including a small group of watercolors by James Barton Longacre and related associative materials), holdings will increase by approximately seventy-one percent during the next twelve months, reaching over 4,300 items by mid-1978 (excluding the Graphics Collection).

Within the next five to fifteen years the Gallery's collections, expanding at normal rates of the past few years, will require considerably more space than is expected to be available for display and storage. This is true despite efficiencies which will be made in our use of existing space and without considering the impact of special collections which might be given or purchased containing large numbers of objects impossible now to predict. All that can be predicted is that opportunities to acquire such collections will be present themselves as they have in the past, and that it will be increasingly necessary to provide space for new and existing holdings. Subsequent study should be given to options available over this longer term toward meeting the space requirements of the National Portrait Gallery not met within its current allotment of the building.

TABLE VI. Hypothetical Distribution of Time Collection by Medium and Space Requirement

<u>Medium</u>	<u>Percent</u>	<u>Number</u>	<u>Space Needed</u>	
			<u>Sq. Ft.</u>	<u>Cu. Ft.</u>
Paintings	65	676	3,282	1,641
Drawings	10	104	144	72
Sculpture	10	104		401
Photos/Graphics	15	156		16
Total		1,040	3,426	2,126 max. 417 min.

The Edouart, Davidson and Longacre collections will be displayed in three galleries of approximately 3840 cubic feet each. Approximately twelve of the Davidson busts will have to be stored, however, (24 cubic feet) and study collection items now stored in Room 112 will be displaced, requiring an additional 1200 cubic feet of general storage elsewhere. (A 5'x4' painting would require 20 sq. feet of screen storage, allowing 1 foot clearance. If stored in a bin, 1/2' clearance would be required, hence the 2:1 ratio of square feet to cubic feet for framed objects used in the charts. Wall storage would be probably most efficient, if the walls were available.)

NZP

Unlike the rest of our museums, the Zoo displays, studies, and interprets live specimens.* The "aliveness" of the objects gives them added appeal with the public, and at the same time creates a set of management constraints unlike those of our other museums.

Samuel Pierpont Langley, third Secretary of the Smithsonian, established the National Zoological Park. Determined to save the American bison from extinction when this species was endangered, he interested Congress in providing a site where these animals and others of equal importance could be protected and displayed in natural surroundings to visitors. A bill was passed in 1889 providing funds for purchase of the land and tract in Rock Creek Valley which was acquired the following year. Washington's Rock Creek Park was not in existence when the Smithsonian established the Zoo at its present location. Among the animals first shown in the Zoo were a herd of six bison.

Under plans laid out by Frederick Law Olmsted, the renowned landscape architect, the National Zoological Park was built with an eye to future development. A collection of live animals that had been kept near the Smithsonian Building was transferred to the new buildings and enclosures and other animals were added by gift, exchange, and purchase. By 1926 the collection numbered 1,700 and in that year the figure was nearly doubled by the addition of animals brought back by the

* The Museum of Natural History does maintain a popular live insect exhibit in its building.

Smithsonian-Chrysler African Expedition headed by Dr. William M. Mann, then director of the National Zoological Park. This was the largest collection of animals ever imported for the Zoo at one time. It included several kinds of monkeys, five leopards, 35 antelope, and many other rare mammals, reptiles and birds. In 1937 the National Geographic-Smithsonian Expedition brought back 879 specimens from the East Indies, and a few years later the Smithsonian-Firestone Expedition obtained many rare and interesting animals from Liberia. Today the collection contains about 2,000 animals, or about 550 species. Included are some of the rarest animals in the world: Ling-Ling and Hsing-Hsing, the giant pandas from the People's Republic of China; the kiwis, flightless birds from New Zealand, and Golden-Lion Tamarins from Brazil.

The population and diversity of the collection have fluctuated over time according to evolving requirements for exhibition, education and research programs. This fluctuation will continue, but as regards collections policies and management, the Zoo's objectives are in a state of metamorphosis -- from cages for containment of the unusual into open areas for display of natural relationships; from a consumer of animals taken from the wild, into a conservator and producer of animals to relieve the pressure on wild populations. The Zoo has gradually changed its old collections philosophy; i.e., large collections and maintenance of a sort of "postage stamp" collection. Large collections and the traditional taxonomic scheme no longer fit today's need, and this philosophy is being replaced with one which is more effective and more closely in tune with the changes taking place in the natural world. The diminishment of wild areas and populations increases the obligations of the Zoo to work with other similar organizations, and to keep the public in touch with these changes.

The recent acquisition of the property at Front Royal, Virginia, and the establishment of the Conservation and Research Center will allow the Zoo to meet its future obligations and continue to refine its collections, philosophies, and operations. The Institution has no plans to convert Front Royal into a park complete with monorail, and intends to keep public viewing to a specific area. Rather, as the property is developed, activities will be concentrated on (1) producing animals for other zoos to relieve pressure on wild populations and (2) research on animal behavior, management and health.

All animal transactions of the Zoo are approved or disapproved by the director, after guidance and review provided by his Animal Planning Board. The Board is composed of representatives of the Front Royal Center, the Zoo's Office of Animal Management, Office of Zoological Research and Office of Animal Health. Various criteria are used by the director and the Animal Planning Board for selection of animals to be added to the collection. In a general fashion, consideration is given first to the educational and research value, followed by an evaluation of the endangered and threatened status, the presence of necessary husbandry skills, breeding potential, and available space.

For an item for potential exhibit, judgments are made which are in keeping with the new and evolving exhibition philosophy; i.e., will the animal help to demonstrate key biological concepts such as natural selection; will it facilitate better public appreciation of animal behavior patterns, special morphological adaptations, convergent evolution, zoo geographic history, adaptive radiation, ecological interactions? As far as research programs are concerned, judgments are made regarding potential contributions to what is known about exotic animal health, pathology, management, reproduction and behavior, under captive conditions.

There have been only a few cases where extraordinary animals, not planned for, became available and required acceptance. This will probably be true also in the future. It will not happen often, but when such incidents occur they will be accommodated.

APPENDIX B

Existing Collection Policy Statements of the Institution and Its Bureaus

COLLECTION POLICIES

SI

Smithsonian Institution Policy on Museum Acquisitions

February 23, 1974

The operation of an international black market in art, antiquities, national treasures, natural specimens and ethnographic material has resulted in the irreparable loss to science and humanity of archeological remains, and the despoliation of monuments and museums. The Institution, by these rules, disassociates itself completely from such illicit trafficking. Further, the Institution undertakes to cooperate fully with foreign countries in their endeavors to prevent this illicit traffic. At the same time, the Institution recognizes that the free exchange of information and artifacts promotes and enhances international comprehension and goodwill. The legitimate international transfer of natural and cultural material should be facilitated by all available means, including loans and sales, and the Institution should encourage such transfers in the same manner as it now fosters international exchanges between museums.

The documentary value of a museum collection is the principal criterion of its excellence, and the public record should therefore be of the highest order or accuracy and completeness. To this end, each object acquired should have a provenance as completely documented as possible. Objects of incomplete provenance should be acquired only when they are of exceptional rarity, when it is reasonably certain that their origin, context and history can be established through scholarly research, and when there is no doubt that the object may have been stolen. An inadequate provenance generally gives rise to doubt as to the licit quality of an object. Each provenance should be made public unless extraordinary circumstances are present.

In consideration of the above policy, the Regents of the Smithsonian Institution adopt the rules set forth below for the acquisition of art, antiquities and other objects. Curators and those empowered to make acquisitions shall be responsible for the application of the rules. Donors, dealers, and correspondents will be notified of this policy.

1. Each curator or officer of the Institution (hereafter: curator), prior to authorizing the acquisition of an object, whether by purchase, transfer, gift or bequest, has the responsibility, in good faith, to ascertain, from the circumstances surrounding the transaction, or his knowledge of the object's provenance, that the object in question was not stolen and is not illegally present in the United States. If the object originated within the United States, the curator should ascertain that it was not illegally or unscientifically excavated.
2. Each curator also has the responsibility to ascertain that any proposed new acquisition was not illegally removed from its country of origin after the date of adoption of this policy.
3. (a) In cases of doubt, the curator should consult widely within the Institution, particularly with those scientists or curators whose interests would be affected by acquisition of the object, and with the General Counsel. Where helpful, a special panel should be created to help pass on the questions raised.

(b) In the case of a substantial proposed acquisition whose acceptability is in question, the Institution will contact the competent authorities or corresponding national museums of the probable countries of origin in order to determine whether the latter can advise the Institution as to the status of the object. If any such object can be demonstrated to form part of the national patrimony of another country, the Institution will take reasonable efforts to effect the object's return.
4. (a) The policy set forth here shall be taken into account in determining whether to accept loans for display or other purposes.

(b) The Institution will not hereafter undertake to identify or authenticate objects which do not meet the above criteria.
5. Each curator should actively pursue a policy of publication of new acquisitions in scholarly journals or otherwise and should not unreasonably delay such publication. The provenance of acquired objects shall be made public, unless the General Counsel finds that there are extraordinary circumstances present in a particular case.

Memorandum from S. Dillon Ripley to NCFA and NPG

May 22, 1970

At its meeting yesterday the Board of Regents adopted the following Resolution, which will henceforth govern the sale or exchange of works of art in the National Portrait Gallery and the National Collection of Fine Arts:

Resolved that no object of art in the permanent collection of the National Portrait Gallery or the National Collection of Fine Arts valued at more than \$1,000 shall be exchanged or sold without prior approval of the museum Director, the museum's Commission, the Smithsonian's Office of General Counsel, and of the Secretary;

that no object of art in the permanent collection of the National Portrait Gallery or the National Collection of Fine Arts valued at more than \$50,000 shall be exchanged or sold without prior approval of the museum Director, the museum's Commission, the Smithsonian's Office of General Counsel, the Secretary, and the Board of Regents;

that the exchange or sale of any object of art in the National Portrait Gallery and the National Collection of Fine Arts shall be reported to the Board of Regents by the Secretary;

and that the proceeds from any such sale shall be used solely for the acquisition of works of art for the museum from which it came.

You will note that all exchanges and sales, regardless of the monetary value, are to be reported by me to the Board of Regents; I will expect to receive such reports from you at least once each year.

I believe that as a matter of course you should secure at least one professional, independent appraisal of any work of art you propose to sell or exchange that is likely to be worth more than \$1,000; in the case of works that are likely to be worth as much as \$50,000, I believe that two such appraisals would be in order. Presumably your respective Commissions will also have views on this question.

COLLECTION POLICIES
COOPER-HEWITT

COOPER-HEWITT MUSEUM
POLICY FOR ACCEPTING WORKS OF ART
Undated. (1970?)

The Museum's Acquisition Committee, consisting of the Director, Curator of Collections and members of the curatorial staff, will meet once a month (following the first general staff meeting of the month) to review objects that have been offered to the Museum. The Director may authorize the modification of this procedure in the case of acceptance of gifts where a tentative approval is required before the committee can meet.

The curator concerned will make a formal recommendation and justification to the Committee, indicating any restrictions attached to the gift. The Committee will either accept or reject the recommendation of the curator and give proper justification for the same.

Objects that are rejected for the Collection may be accepted as study material, for use (such as to decorate offices), or for the Museum's annual auction of donated objects, provided that the donor is informed and agrees.

Gifts with severe restrictions or those that do not relate specifically to the interests of the Museum, will generally not be accepted.

When the Museum has funds to purchase objects, expenditures beyond a certain amount will require the approval of the Museum's Advisory Board.

COOPER-HEWITT MUSEUM
POLICY FOR DE-ACCESSIONING WORKS OF ART

1. A curator will recommend the exchange or sale of a work of art to the Museum's Acquisition Committee. (This committee consists of the Director of the Museum, the Curator of Collections, and members of the curatorial staff.)

2. The Museum will ascertain if there is a legal or moral restriction against disposal and will obtain two outside appraisals on items of over \$1,000.

3. If there are no restrictions against disposal, the Acquisitions Committee will recommend the exchange or sale to the Museum's Advisory Board.

4. Members of the Executive Committee of the Board will be invited to view the object in question.

5. The Executive Committee will ask the Board to recommend the exchange or sale. If the work of art is valued at more than \$1,000, then approval by the Secretary of the Smithsonian Institution, the General Counsel, and the Assistant Secretary for History and Art is required.

6. If the work of art is valued at over \$50,000, then approval of the Board of Regents of the Smithsonian Institution is required.

7. The exchange or sale of any work of art will be reported to the Board of Regents by the Secretary of the Smithsonian Institution.

8. Prior to the sale, written notice will be sent to interested museums, collectors, and the press.

9. The objects will be sold at public auction or to the highest bidder if not accepted by an auction house.

10. Funds acquired from the sale will be used solely for acquisitions. New acquisitions from these funds will bear the name of the original donor. Objects received in exchange will also bear the name of the original donor.

COLLECTION POLICIES
FREER

The Freer Gallery of Art has not prepared a separate document to convey its acquisition policies. However, details governing Freer acquisition and disposition policies are carefully spelled out in Material Papers Relating to the Freer Gift and Bequest.

The guiding principles and specific administrative procedures governing the acquisition's policy of the Freer Gallery of Art were first formulated by Charles Lang Freer. Although those procedures appear in Mr. Freer's Will, the most detailed statement appears in a letter from Mr. Freer, dated June 14, 1919, and addressed to John E. Lodge, first Director of the Gallery.

"In order that occasionally, in the years to come, important objects of a high standard of aesthetic quality and excellence, related to the collection as it now exists, may be added thereto, I have left in my will a bequest the income of which is to be expended for such purpose by the Regents of the Smithsonian Institution, providing that the object or objects under consideration are approved by the majority of the members of a committee composed of the Secretary of the Smithsonian, the National Fine Arts Commission, the Keeper of the Freer Collection, and during their lifetimes, Miss Rhoades, Mrs. Eugene Meyer, Jr., and Mrs. H.O. Havemeyer. This arrangement will, I believe, protect the collection from undesirable additions, and at the same time allow it in the future to expand by the acquisition of specimens of the highest quality.

"I am forwarding a copy of this letter to Dr. Charles D. Walcott, Secretary of the Smithsonian Institution, for the consideration of the Regents of that Institution and himself."

Dr. Walcott wrote to John E. Lodge on December 30, 1920, as follows:

(2) That insofar as may be compatible with the provisions in Mr. Freer's will, no object or objects of any kind shall be purchased for or put in the building or court of the Freer Gallery of Art without consultation with and approval of the Curator.

(3) Under paragraph four of the First Codicil to the Last Will and Testament of Charles L. Freer, the Curator and those empowered as provided in said paragraph to recommend the purchase of works of art for the Freer Gallery of Art, shall consider and recommend to the Secretary whether the opportunity to make such purchases exists.

Throughout the years, the Freer Gallery has followed the regulations described above. Mrs. Eugene Meyer, Jr., the last of the people specifically named in Mr. Freer's Will, died in 1970. After her death, approval for the purchase of objects by the Freer has been obtained from the Secretary of the Smithsonian and the Fine Arts National Commission.

The Freer Gallery of Art's policy on the disposition of objects in the collection is also carefully spelled out by Mr. Freer in his Deed of Gift, where he states that once his collection had been delivered to the Smithsonian Institution, no objects should ever be deducted from it. In other words, the Gallery is expressly forbidden to dispose of any object, once it has become part of the collection.

There is another stipulation made by Mr. Freer in this Deed of Gift. He states that no other object of any kind shall ever be exhibited in the building in connection with those given by him, nor should those objects be removed at any time except when necessary for the purpose of making repairs or renovations in the building.

The Freer Gallery of Art has always placed great emphasis on acquisitions. However, the acquisition's policy is a highly selective one. In the half century since the Gallery opened to the public, approximately 2,000 Oriental artifacts have been added to the 9,500 objects that constituted the original Freer bequest. The relatively small number of acquisitions reflects the Gallery's concentration on quality rather than quantity. It is not surprising then, that specialists in Oriental art frequently refer to artifacts of the finest type as being of "Freer quality." At the same time, space limitations and financial restrictions also have been determining factors.

In decisions relating to new acquisitions, the foremost criteria are quality and an overall concern for expanding or complementing specific areas of the collection. To ensure that the acquisition's policy would be as successful as possible, the Freer Gallery assembled a small but highly specialized staff, who had expertise in the areas of Oriental art history and technical conservation. Objects being considered for acquisition are jointly studied by the curatorial staff and then subjected to any technical tests that might help to determine questions of composition, fabrication and repair. The opinions of the art historians can thereby be supplemented by the technical findings of the conservation staff. These procedures have helped to maintain the quality of acquisitions, and the Freer Gallery has also become an internationally recognized center for art historical and technical research in those areas encompassed by the collection.

Together with art historical and technical research, scholarly publications have also played an important role in the Gallery's acquisition's policy. The same specialists who have been involved in decisions relating to acquisitions have prepared publications in which the artifacts are discussed and thereby made available to students, scholars and the general public.

COLLECTION POLICIES HMSG

The policies governing acquisition and disposition of museum objects by HMSG are not set forth in a separate document but are incorporated in the bylaws of the trustees and in resolutions adopted by the Board. The pertinent sections of the bylaws are reproduced below along with the complete texts of the resolutions.

BYLAWS OF THE TRUSTEES OF THE JOSEPH H. HIRSHHORN MUSEUM AND SCULPTURE GARDEN (As amended to and including October 14, 1976)

ARTICLE I.

Establishment

By an act of the Congress of the United States entitled "An Act to provide for the establishment of the Joseph H. Hirshhorn Museum and Sculpture Garden," approved November 7, 1966, "there is established in the Smithsonian Institution a Board of Trustees to be known as the Trustees of the Joseph H. Hirshhorn Museum and Sculpture Garden."

ARTICLE II.

Functions, Powers and Duties

Section 1. The primary functions of the Board shall be as set forth in Section 3(a) of the Act: to provide advice and assistance to the Board of Regents of the Smithsonian Institution on all matters relating to the administration, operation, maintenance, and preservation of the Joseph H. Hirshhorn Museum and Sculpture Garden. The Board shall have the sole authority (i) to purchase or otherwise acquire (whether by gift, exchange, or other means) works or art for the Joseph H. Hirshhorn Museum and Sculpture Garden, (ii) to loan, exchange, sell, or otherwise dispose of said works of art, and (iii) to determine policy as to the method of display of the works of art contained in said museum and sculpture garden.

Section 2. A report of the Board for each year shall be submitted with the report of the Secretary of the Institution at the Annual Meeting of the Board of Regents in January, and shall be printed in the annual report of the Board to Congress.

ARTICLE VI.

Committees

Section 3c. The Committee on Collections

In accordance with such policies as from time to time may be adopted by the Board, the Committee on Collections shall consider the acquisition of works of art for the collections, and the disposition of works of art by sale, gift, exchange or otherwise, and make recommendations thereon to the Board. The Board shall present a report of such acquisitions and dispositions to the Board of Regents at the regular annual meeting of the Regents in January each year.

RESOLUTIONS EMPOWERING THE DIRECTOR TO MAKE CERTAIN ACQUISITIONS ADOPTED BY THE BOARD OF TRUSTEES AT ITS MEETING OF MAY 12, 1976

RESOLVED that the Board of Trustees of the Joseph H. Hirshhorn Museum and Sculpture Garden, which Board is authorized and empowered to purchase or otherwise acquire works of art for the Joseph H. Hirshhorn Museum and Sculpture Garden, does hereby delegate to the Director of the Museum the authority to negotiate and conclude on behalf of the Board the purchase of such works of art as he shall determine to be appropriate for the Museum's permanent collection; provided, however, that:

- (a) No individual purchase shall be so concluded by the Director at a price in excess of \$10,000; and
- (b) The aggregate price of all purchases so concluded by the Director during any fiscal year shall not exceed (1) in the case of works of art purchased with the acquisition of funds appropriated by the Congress to the Museum for such fiscal year, one third of the amount of such funds, and (2) in the case of works of art purchased with the Museum's private funds, the sum of \$20,000; and be it further

RESOLVED, that the Director of the Museum:

- (a) Shall, not less than thirty days after concluding the purchase of any work of art pursuant to the foregoing delegation, notify each member of the Board in writing of the details of such transaction, including in each case the name of the artist, a full description of the work, the name of the vendor and the purchase price paid by the museum; and

- (b) Shall submit to the Board at each of its meetings a list of all works of art so purchased since the immediately preceding meeting of the Board, including in each case the name of the artist, a full description of the work, the name of the vendor and the purchase price paid by the museum.

COLLECTION POLICIES NASM

Statement of policy - January 22, 1974

The National Air and Space Museum is keenly aware of the fact that the large size of today's flying machines, coupled with an ever-accelerating pace of aerospace technology, results in tremendous pressure on curators to increase the size of their collections. At the same time, however, the available storage space is not increasing at the same pace, and, therefore, increasing selectivity must be exercised in acquiring new objects. Furthermore, each addition to the collection should be balanced, wherever possible, by an equivalent deletion or loan to prevent overflowing our warehouses.

The responsibility for acquiring major new artifacts lies with the Museum Director. Curators, through their Assistant Directors, should recommend the acquisition only of those objects which have been extensively researched and determined to be of great historical or technical significance. Highest priority should be given those artifacts required for a planned exhibit.

COLLECTION POLICIES NCFA

Statement of policy - December 1970

For some years, the collections of the National Collection of Fine Arts have been divided into three categories: the Permanent Collection; the Smithsonian Lending Collection; the Smithsonian Art Study Collection. The policy governing these three collections was last revised in October 1965. At the May 1970 Commission meeting, the Director pointed out that the division had become arbitrary and ultimately meaningless and recommended that the collection be considered as one body of works which served various purposes. On the acquiescence of the Commissioners, the following statement of policy was prepared to supercede the previously published statement (Collection Policies of the National Collection of Fine Arts with Special Reference to the Smithsonian Art Lending and Study Collections, revised October 1965).

Once any work enters the collection of the National Collection of Fine Arts it is entitled to the same degree of care in handling and maintenance as every other. Some works, however, because of their condition, their particular quality or their importance to the collection must be given special safeguards. For this reason, works will be listed in three categories: those which can never be lent (except under the most exceptional circumstances); those which can be lent to other museums affording conditions comparable to our own; and those available for loan to executive and cabinet offices under other than museum conditions. As time goes on, works will doubtless be reclassified in order to assure their preservation or to accord with new uses of the collection.

By its very nature, the collection of the National Collection of Fine Arts serves several functions. The breadth of its holdings ranging from lesser known as well as "popular" painters to well remembered masters, is one of its particular virtues and should be maintained. While the collection should acquire works on the basis of quality, care must be taken that quality be judged within the category or work itself, and not simply on the basis of current taste or transient interest. Within necessary limits of space and possibilities of care, the collection should aim to be inclusive rather than only representative. Otherwise its usefulness for future scholars will be lessened.

All of these functions should be borne in mind when acquiring works for the collection, and works in all categories should be brought to the attention of the Art Commission in their review of accessions.

COLLECTION POLICIES NMHT

The pertinent sections of NMHT's collection policy are reproduced below.

April 5, 1973

The museum's first responsibility is to the collection. Acquisition, preservation, and interpretation of the collections are the joint responsibility of the Director and the professional staff. Policy regarding purpose and direction of collecting activity shall be flexible. The collections exist for the public's benefit and should be made as accessible as is consistent with the safety of the objects.

I. General Criteria for the Collections

- A. The object shall possess potential for research and scholarship, now or in the future. And/or
- B. The object shall be useful for exhibition purposes, now or in the future. And/or
- C. In the most general sense, the object or collection shall be significant in itself so that it merits inclusion. Technological, social and historical factors should be weighed. Association, aesthetic merit, rarity, and status in its own particular category should be considered.

II. The Collections Committee

- A. The Collections Committee shall consist of between five and seven members who shall be appointed from the curatorial and technical staff by the Director. The Registrar shall be a permanent member of the Committee.
- 4. The Collections Committee shall meet at least once a month and may meet at any time action is required.
- 5. A quorum shall consist of three members. If a quorum is not available in an emergency situation, the Chairman or Vice-chairman may appoint alternate members. All actions, except de-accessioning, shall be by majority vote. Minority opinions may be included in any recommendations to the Director.
- B. The Collections Committee shall review its policy and procedure at least every three years or upon request of the Director.

C. Powers

1. The Collections Committee will consider matters under its jurisdiction, make decisions and recommend specific action to the Director.
2. The following areas relating to the collections will be within the Collections Committee's jurisdiction:
 - a. Gifts, bequests, purchases
 - b. De-accessioning
 - c. Loans to the museum
 - d. Loans from the museum
 - e. Storage of the collections
 - f. Preservation and Conservation
 - g. The NMHT Registrar's Office policies and procedures
 - h. Policy and planning for collections-related publications
 - i. Sale of reproductions and collection-related items in the museum shops.

III. Procedures

A. Gifts or bequests

1. Accepting gifts or bequests will be left to the discretion of the curator involved except:
 - a. When large items are offered; defined as occupying a space (singly or grouped) exceeding 10 cubic feet.
 - b. When an extensive collection is offered; defined as exceeding 20 items.
 - c. When a specimen offered represents a new area of collecting for the museum or for a division.
 - d. When packing, transportation or storage costs exceed \$100.00.
2. The Collections Committee shall make recommendations to the Director in the cases of gifts or bequests of large items, extensive collections or new areas of collecting.
 - a. The curator involved shall send the Collections Committee a written request and justification, with a copy to the Director.
 - b. The Collections Committee promptly shall hold a hearing on the matter and make a recommendation to the Director. The curator involved or his representative shall be present at this hearing to explain his position.

- c. The curator involved and/or the Collections Committee may secure outside opinions.
 - d. Upon receiving the Collections Committee's recommendation, the Director shall make a prompt decision on the matter.
 - e. Accession papers (or a preliminary notice of accession) for all acquisitions shall be filed with the Registrar within ten days after the date of acquisition.
- 3. The acceptance of all gifts and bequests shall be unrestricted. No commitment shall be made as to exhibition, attribution, or placement of the gift. No guarantee shall be made that the gift or bequest be retained by the museum in perpetuity. There shall be no exceptions to this policy unless any such restrictions or special provisions are approved in writing by the Collections Committee and the Director and a statement of approval filed with the Registrar.
 - 4. Accession papers (or preliminary notice of accession) for all acquisitions shall be filed with the Registrar within ten working days following receipt of the acquisitions.
 - 5. All gifts and bequests shall be acknowledged by a certificate of appreciation. Letters of acknowledgement shall accompany the certificate.

B. Purchases

- 1. Purchases from private funds under the curator's control, and purchases made with money given by donors to accomplish a specific purpose, will be left to the discretion of the curator. However, the provisions of III A 1a-d must be complied with.
- 2. Funds specifically allocated to the museum for the purchase of objects plus other monies that may become available for purchases shall be retained in the Director's Office. The Director's Office shall advise the Collections Committee as to the approximate amount available for purchases in each quarter of the fiscal year.
- 3. Proposals for purchases may be submitted by the curators to the Collections Committee at any time. Priorities shall be assigned on a continuing basis. The Collections Committee shall advise the Director's Office on the amount of purchase money that should be kept available for emergency purchases. The Collections Committee shall advise the Director's Office in the making of specific purchase commitments. The ultimate decisions as to regular purchases, extent of reserves, and emergency purchases will be made by the Office of the Director.
- 4. The procedures for considering and recommending purchases shall be the same as set forth in III A 2a-d above.

5. The Collections Committee shall make a full report to the Director's Office on January 15 and July 15 stating the status and disposition of all request purchases for the preceding six-month period.
6. In addition to the general criteria cited in I A-C above, the following factors shall be considered by the Collections Committee and the Director:
 - a. Is the piece to be purchased necessary for exhibition or for scholarship?
 - b. Will the piece to be acquired have importance within the context of the museum's collection?
 - c. Must the piece be purchased? Have attempts been made to secure it as a gift?
 - d. Is the price fair?
 - e. Is the object in appropriate condition? Has it been carefully examined? Have factors of restoration been considered?
 - f. Does the purchase appear merited when compared to other requests?
 - g. Each division will receive fair consideration for justified purchases, but there will be no requirement to allocate funds as to any pre-determined formula.
- C. De-accessioning. This includes condemnation for the purpose of the destruction of specimens or de-accessioning for the purpose of exchanging or otherwise disposing of duplicates or specimens not wanted in the collections. Any such disposal "requires particularly rigid examination" (quoted from "Professional Practices in Art Museums," Museum News, October 1972).
1. Procedures set forth in III A2a-d shall be followed. In addition the curator requesting a de-accessioning action shall provide a list of the items to be de-accessioned to the curatorial staff at least two weeks prior to the date when the Collections Committee shall consider the request for de-accessioning.
2. The vote of the members of the Collections Committee present at the meeting must be unanimous in order to recommend condemnation.
3. The written recommendation to the Director shall contain an explanation and justification. This statement shall be filed with the Registrar if condemnation is ordered.
- D. Loans to the museum. The general policy shall be to accept as loans only items needed for exhibit and study. In the past, the museum has been taken advantage of as a place for free storage, to display items that are for sale, or to give a pedigree to items.

1. All proposed loans, except for special exhibitions, shall be presented to the Collections Committee. The procedure set forth in III A 2a-d shall be followed.
 2. All loans to the museum made after January 1, 1973, shall be for a specific minimum period of time (usually 3 years).
- E. In loans from the museum the safety of the object in packing, transportation, and loan exhibition shall be the prime consideration.
1. Loan of objects or collections of minor importance shall be arranged by the curator.
 2. Loans of important objects or collections shall be authorized according to the procedures set forth in III A 2a-d.
 3. Requests for all loans from other bureaus of the Smithsonian shall be in writing and routed through the Office of the Director. Upon receipt of such requests, the curator shall follow the same procedure in securing authorization as in loans to outside institutions.
 4. Loans, in and out, of objects evaluated at \$5000 or more must be reviewed by the Collections Committee.

COLLECTION POLICIES NMNH

Statement on control of acquisitions - July 27, 1977

The collections of plants, animals, fossils, rocks, and human artifacts housed at the National Museum of Natural History are a living body of information. They represent an accumulation of knowledge about the natural world which has been gathered by thousands of researchers over the last 150 years or so. The collections are in constant use by present day researchers, both from the Smithsonian and elsewhere, and are being selectively added to as new parts of the world are opened for investigation and as new habitats and organic relationships are explored. The National Collections are both comprehensive in their coverage and extremely varied in detail, so that no single individual can reasonably judge what should be added or retained in such diverse collections. Therefore, over the years, the Museum has hired a staff of expert scientists, whose chief standing obligation is to maintain and improve the collections. It is necessary, in order to fulfill this function, that Museum scientists be very familiar with the state of knowledge within the subject matter area covered by the collections under their care.

Responsibility for the care of the collections has been delegated by the Secretary to the Director of the Museum. In the past the Director had given the scientific staff of the Museum considerable freedom as to the number and kinds of new specimens to be added to the collections. This was both necessary and desirable during the early days of intensive exploration of the natural environment. For example, we are particularly fortunate that aggressive collectors were on the scene during the days of westward expansion, else we would have lost a great deal of knowledge about the native peoples of America. However, because of the great increase in the number of curators in the Museum since 1955, and the rapidly increasing cost of maintenance and storage of the collections, it has become necessary for the Museum administration to be more involved in deciding what can be added to the collections. Involvement of management in collections decision-making has also been required in the increasing number of instances in which small university museum collections have been discontinued and the Museum has been asked to accept them.

The new policy involves both peer and administrative review of proposed new additions to the collections. It will always be true that the individual scientist-specialist will be in the best position to determine what should or should not be added to the collections in his care. However, it is not always the case that each individual scientist has the needed Museum-wide perspective to determine how space and other resources should be allocated to meet all current needs and to properly plan for future needs. In recognition of this situation the Director has established the following set of procedures for collections management within the National Museum of Natural History:

1. Each individual scientist is permitted to acquire on behalf of the Museum small numbers of specimens each year. These are ordinarily research materials gathered for immediate study. Some of these specimens may ultimately be discarded after research is completed. Such acquisitions are limited to less than 100 cubic feet per scientist per year.
2. Committees have been established within each of the scientific departments to consider large acquisitions. Each committee reviews every proposed or possible acquisition over this minimum level and recommends a course of action to the Departmental Chairman. The Chairman, based upon knowledge of the space resources available to the Department, makes the final decision for small to moderate sized collections. For larger collections the final decision is the Director's. In any case the Chairman informs the Director of all decisions to house additional collections. In the case of truly large collections, such as might become available from another Museum which is closing its doors, the Director consults with and seeks guidance from the Assistant Secretary for Science and the Secretary of the Institution.

The collection management policy has been operational in the Department of Entomology for the last 4 years and in the Department of Anthropology for the last 2 years. It has been instituted in the remaining 5 scientific departments during the course of 1977 and is working very effectively.

As long as new knowledge is obtained from nature it will be necessary to increase the size of the collections which document this knowledge. The purpose of this policy is to cause the careful review of all acquisitions so as to assure that poor or unneeded specimens are not accepted. At the same time the controls are not meant to discourage growth of collections because there are many areas in which they should grow to fill existing gaps. In light of the variety and complexity of specialities in the natural sciences there is no doubt that the best judgement as to what should or should not be added to the collections is possessed by the individual scientific curators. In light of dwindling space and funding resources for the storage and maintenance of these collections, it is both necessary and appropriate that the individual judgements of the curators be reviewed by peer groups and science administrators so that the available resources are applied to the best advantage. The simple, straightforward procedures outlined here take into account these realities and provide a mechanism for the orderly control of the collections at the National Museum of Natural History.

COLLECTION POLICIES NPG

The National Portrait Gallery has not prepared a separate document to convey its acquisition policies. However, details governing NPG acquisition and disposition policies are given below.

Public Law 97-443 (1962) stipulates that the National Portrait Gallery:

shall function as a free public museum for the exhibition and study of portraiture and statuary depicting men and women who have made significant contributions to the history, development and culture of the people of the United States and of the artists who created such portraiture and statuary.

As amended in 1976, the Act defines portraiture as:

portraits and reproductions thereof made by any means or process, whether invented or developed heretofore or hereafter.

The Act enables the Board of Regents to:

- (1) purchase, accept, borrow, or otherwise acquire portraiture, statuary, and other items for preservation, exhibition, or study. The Board may acquire any such item on the basis of its general historical interest, its artistic merit, or the historical significance of the individual to which it relates, or any combination of any such factors. The Board may acquire period furniture and other items to enhance its displays of portraiture and statuary;
- (2) preserve or restore any item acquired pursuant to paragraph (1);
- (3) display, loan, store or otherwise hold any such item;
- (4) sell, exchange, donate, return, or otherwise dispose of any such item.

Finally, the Act provides for a National Portrait Gallery Commission, which meets twice yearly to review and approve potential acquisitions presented by the staff, including gifts. Approval of the Commission and subsequent ratification by the Board of Regents are necessary for all accessions.

COLLECTION POLICIES NZP

*Policy for acquisition, management and disposal of animals
July 29, 1977*

Introduction

It is recognized that the National Zoological Park has a duty to the public it serves and to the animals in its care. That duty is best served by effectively using its resources in advancing and diffusing knowledge. This is best accomplished through trying to enlighten our visitor to the need to preserve all wild things and to appreciate their differences. It is the crux of our message and is the foundation of our acquisition plan. Our obligation to the animals is met by humanely taking and keeping each specimen with the hope that animal populations can only be helped by our efforts. In addition we have a duty to learn as much as we can about each specimen while we have it captive so that we may help species survive in the wild as well as in zoos. In doing these things we must work within the intent of all laws and regulations.

Acquisition

Before a recommendation for species selection can be made to the director by the Animal Programs Committee, it may have to run a gauntlet of criteria. These criteria are based on our mission to advance and diffuse knowledge through the maintenance and presentation of a large and diverse selection of species of animals and to carry out animal studies in a formal manner. The former advances the knowledge of our visitor through the use of the animal collection as an interpretive vehicle. The latter advances our own knowledge and the diffusion takes places in traditional ways.

Acquisition Value Alternatives

Value to the Public

1. It is admitted that certain species are associated with zoos and are expected by the public.

2. We will attempt to provide our visitor with species and specimens that are interesting in appearance and/or behavior especially those that can be used to illustrate a concept or have other value as a teaching aid.

3. In some instances a species will have unique qualities that give it high visitor interest. Species of great fame or infamy are justifiable as long as their exhibition is of a positive sort and contributes to the knowledge and enlightenment of the visitor.

4. A species may be admitted for consideration should it represent a form not now represented in the collection. The extent to which new forms are admitted will depend largely on the impact it would have on current programs and available resources.

Value for Study

Studies carried out in a zoological park may require the addition of species not now in the collection. Such studies must first be approved by the Director with the positive recommendation of the Animal Programs Committee. Factors to be considered in studying species in a zoo setting are:

1. It should aid the wild or self-sustaining populations of the species or other species.
2. It should fill in gaps in the current state of knowledge of that species.
3. It should aid us in learning about a kind of animal so that the information can be used in the preservation of endangered species.

Value for Preservation

With a serious commitment zoos can do much toward saving some endangered species from extinction through captive propagation. With the resources and knowledge to develop responsible programs, certain endangered or threatened species can be selected for the zoo. Animals that are only uncommon in zoos but are abundant or at least stable in parts or most of their natural range are not admissible under this alternative.

Management

Even though a species may be justifiable through the use of the above criteria, it will be placed into competition for resources with those species and specimens already present in the zoo. The resources and knowledge we possess all will grow at their own rate. Each proposed selection must be viewed critically for its impact on these slow growing resources and therefore on programs that are already on the way. A selection may be justifiable but may require such a drain

on our stock of energy as to make it unaffordable. When selecting we must constantly consider caging needs, dietary requirements, medical knowledge and problems, the amount known about captive biology, reproductive needs, and most of all the amount of our most expensive resource, people. We would reject any selection should the cost of bringing in a species outweigh any benefits. Even a highly justifiable selection might be rejected or a former selection might be reconsidered in light of this new development. Appendix I is a checklist that should be used in evaluating each proposed selection.

Once an animal has been legally brought into the zoo by the above criteria, we must keep a complete written record of its history. This begins with collecting data, if possible, and ends with the specimen's final disposition. Anything learned about the specimen while it is in the zoo is important to record and be able to retrieve. The management of each species will consist of a program of care, feeding, hygiene, study, manipulations to produce breeding, often sustaining that breeding, placing offspring, replacing worn-out specimens from our own stock, from that of other zoos or from the wild, and in controlling the quality of the phenotype where we are producing a continuous line of animals. For those species where sustained breeding is possible, we have a responsibility as custodians of a gene pool to attempt to maintain a genotype as close to the wild form as is possible given the problems of captive breeding. Our efforts are geared to find the minimum level needed to produce positive results as it must be carried out on as large a number of species as is possible given fairly fixed resources. For those specimens where breeding on a sustained basis is not a reality or is not desirable, we will attempt to gain a maximum number of good exhibit years as is possible. This should not be interpreted in such a way as to hinder the reproductive efforts of this or other species when resources become a problem.

While any species is kept in the zoo, its presence must serve a purpose. Where programs of breeding or study are appropriate, they should be developed in some reasonable period of time and be regularly reviewed according to our changing resource needs.

Retention and disposal of living animals

Retention

1. Indefinite retention of any species will never be assumed. Guidelines will be applied on each and every species in our care at least once in any three year period to determine the value of our continued investment in that animal.

Disposal

1. Living animals will be sold, loaned or traded to institutions or private parties only, when the zoo recognizes that institution or individual as qualified to carry out an exhibition/research or propagation program on the species in question that is compatible with our goals. Written agreements must accompany all loans and trades. A copy of our goals must accompany any sale.

2. We are responsible for the well-being of every specimen in our care. The zoo must approve the manner of disposal as well as the ultimate end point of every specimen. This should be in agreement with our stated purposes. Wherever possible, we should attempt to directly place an animal in another zoo. Should we be forced to deal through a commercial enterprise, we should seek assurance that the final destination of the animal is compatible with our policies.

3. Animals may be released into the wild within the appropriate habitat when we are assured of their chances for survival and it is in accordance with all laws. No exotic animal will be released into the wild where a native species would be harmed or displaced.

4. When other options have been exhausted, we will cull those specimens that are deformed, old or otherwise not suitable for breeding or exhibition. Euthanasia, authorized by the director, will be administered in a humane fashion under the veterinarian. It is agreed that to keep an animal beyond its normal life expectancy is of doubtful value. To seek longevity records for specimens at the expense of valuable resources is counterproductive. Animals that are to be euthanized may be subject to appropriate short-term clinical research. Such studies will be reviewed by the Animal Programs Committee and must have the approval of the director.

Disposal of dead animals

1. Based on consideration of the value of the specimen to the museum or research staff, the pathologist will be given the first opportunity to gain as much information as is possible to insure better care for current and future collection animals.

2. USMNH will be given any specimen that passes from the Office of Pathology providing that they have a serious need for the animal. Should the museum have no such need, it may be preserved by the office from which it came in such a way as to be available for study in the future or to be loaned to our education offices for their programs.

3. No animal remains nor any part of any animals will be given, sold or loaned to any private party except as part of a research or education project whose purpose has been explained in writing to the Animal Programs Committee and has the approval of the Director.

4. All dead animals or their parts not utilized as above will be buried, incinerated or fed to the living animal collection as determined by the curator of the unit and the veterinarian.

5. All laws governing the disposal of dead animals or parts of dead animals will take precedence over any disposition stated above.

The National Zoo ultimately would like to be able to supply all of its animals from captive breeding stock, except where we can responsibly take from the wild. Our final obligation is to help preserve all living things. Our small but important role can be carried out through the enlightenment of the public and through our studies. In our zeal to do this well, we must not inadvertently and thoughtlessly do damage to those creatures we seek to protect. This policy should help us with our professed task without wandering away from our original intent. It should be constantly applied and reviewed so that we never lose sight of what we are really here to do.

APPENDIX

Can the species be maintained in a zoo?

1. Is the species well known in zoos? Is the medical care well known with procedures well established? Is the zoo biology fairly complete? Is the propagation outlook pretty good?
2. Has this species been kept in zoos fairly often with good success although a great deal still needs to be learned in order to provide good medical care, to keep it alive and to breed it on a long term basis?
3. Is this a species that has not had a long history in captivity although some close relatives have been kept with reasonable success? Is our medical knowledge and zoo biology incomplete so that a great deal of observation and manipulation is needed to care for this animal? Is the propagation outlook unknown?
4. Is this a species that is rarely kept in zoos so that we know little of how to medically treat it or keep it alive and breeding in captivity? Would this selection take away from study efforts on other species?
5. Is this a species whose past history in zoos has been poor? Does it have a short life expectancy and its captive needs have yet to be discovered? Does this selection merit the effort needed to work out solutions to its survival in zoos?

Dietary requirements

1. Can this species be fed from standard animal food supplies?

2. Will it consume large quantities so as to make it uneconomical to keep?
3. Does it require the use of a food type not normally kept in the zoos but readily and economically available?
4. Will an expensive new food need to be brought into the zoo to feed this animal or will that food supply be erratically available?
5. Are other wild animals required as food for this species?

Caging requirements

1. Can a present cage be used? If so what is the program value of the species to be displayed?
2. Must an existing cage be modified using the resources of OFM?
3. Must an existing cage be modified at an expense large enough to require competitive contract?
4. Must a new cage be built for this species?
5. Is additional off-exhibit caging needed for the management of this species?

Personnel needs

1. What will be the impact on current animal keeper efforts with the addition of the new species?
2. Will we need to hire new keepers?
3. Will the recordkeeping demand increase with the new species?
4. What amount of time will be needed to study the species?
5. What human resources will be needed to create long range planning for the species if it is our intent to breed it in captivity?
6. What additional personnel or time will be needed to maintain an attractive exhibit for this species?

APPENDIX C

Selection and Disposition Study

To better understand the general processes involved in managing collections, the National Museum of Natural History was asked to undertake a study of selected areas of its anthropological holdings. The principal objectives of the study, which specifically focused upon policies and procedures that limit and control collections growth, were threefold:

- o To provide examples that would help clarify the management and control steps involved at departmental and curatorial levels encompassing activities related to (1) the screening of new materials prior to their accessioning and retention plus (2) the screening and review of materials that have been in the Institution's official care for some years. The impact on space was to be particularly noted in these processes.
- o To review past anthropological collection management procedures in an effort to clarify ways these have changed and have been improved, and to relate these improvements to the Natural History Museum's overall development of a collections management policy.
- o To assess progress to date with respect to using automatic data processing (ADP) in managing objects for research purposes and for furthering control over the existing anthropological collections.

The full report, which will be submitted separately, is comprehensive and contains detailed results.

While not representative of the screening and accessioning processes at work in the history and art operations of the Institution, Anthropology was chosen for this study because the activities fairly reflect the kinds of

processes and controls at work in other departments of the Natural History Museum such as Botany, Mineral Sciences, Paleobiology, and Vertebrate and Invertebrate Zoology. In addition, the results of the study may affect the development and implementation of an overall collection policy for the Museum related to the future operations of the proposed Museum Support Center. Since the Natural History Museum will be the principal occupant of the first building, it is important to understand the mechanisms at work in that portion of the Institution's operations.

MUSEUM COLLECTIONS IN ANTHROPOLOGY

Without systematic museum collections much of what we know about man's environment, his biological evolution, and his social and cultural diversity would have been undiscovered. Natural History museum collections consist of related sets of objects and their supporting documentation. Accession records, catalogues, and field notes recording how specimens were selected are basic to all scientific collections, for no specimen is complete without its documentation. Within natural history, anthropology collections encompass a diverse range of objects. Human skeletal materials, archeological specimens and material culture from ethnographic contexts all provide concrete bases for the scientific examination of man's nature. Anthropology collections thus function primarily as data banks for scientific research. In addition, anthropological specimens may be used for educational purposes as exhibit, teaching and training materials.

Standards used in evaluating anthropological museum collections follow from their use in scientific research. A collection should provide a complete, representative, and well documented record. These standards provide a basis for judging the anthropological value of individual specimens and whole collections before they are accepted into the permanent collections. The requirements of the collection management process reflect the same standards. Collection control procedures are designed to preserve the physical specimens and their documentation as well as the integrity of the whole collection. The permanent loss of a few strategic specimens can seriously impair or totally destroy the research value of an entire systematic collection.

Procedures designed to limit the size of anthropological holdings occur at two points in the collecting process. The screening of potential collections before and during accessioning constitutes the most effective curb on collection growth. In addition, the ongoing processes of collections management may identify a number of undesirable specimens. These are recommended for de-accessioning and, after the appropriate formal procedures, may be removed from the collections.

SCREENING DURING ACCESSIONING

In the accessioning process, potential additions to the anthropology holdings are subjected to a two-stage screening procedure. The appropriateness of objects offered to the department is normally first judged by the curator ultimately responsible for their care. While the number, kind, and quality of

potential specimens offered vary from one curatorial area to another, conservative estimates place the level of rejection for professional and scientific reasons at seventy to ninety percent. Further, of the acceptable fraction many are not recommended due to the lack of purchase funds. A potential accession receives its second screening during the formal presentation to the Anthropology Collections Advisory Committee. Here a large percentage of the proposed acquisitions (about 85%) are approved, since this committee serves largely to insure that the established departmental policy has been followed.

In order to provide detailed information about pre-accessioning disposition, the study focused upon the recent processing of two potential accessions. These case studies involved large collections that were brought to the Mall museum and housed during their study and screening. This practice is typical of archeological research because excavation sites often lack the equipment and facilities for adequate examination. Further, field time is frequently limited and must be employed to complete the excavation as planned. Materials from the Jones-Miller site, a Paleo-Indian bison kill, provided an example. A similar situation occurs when a large body of privately held materials is donated to the museum. A particular donated ethnographic collection exemplified this kind of accessioning problem.

JONES-MILLER SITE CASE STUDY

The recently discovered Jones-Miller site in northeastern Colorado dates back some 7,000 - 10,000 years. The scientific value of the site lies in the

completeness of the excavation and in the broad range of biological and cultural data recovered. These provide evidence about the ancient environment and the Paleo-Indian's ecological role. The remains of the approximately 300 slaughtered bison constitute the richest source of data. These provide information about hunting strategy, butchering technique and bone working technology. Further, paleontologists consider these bones to be a crucial population for investigating the apparent extinction of a series of large bison species in the western United States. The excavators used a wide range of recovery techniques which yielded large volumes of partially processed materials. The largest bodies of materials were bison bones, soil sample, and screenwash. While the sorting and screening process is not yet complete, enough work has been done to predict that about 40% of the volume originally brought back to the museum will be discarded. Most of this is waste to be thrown away once its scientific value has been extracted. In addition, some bone fragments may be destroyed in the Carbon-14 dating process, and type specimens of microfauna may be sent to other institutions. The results are significant because they demonstrate the degree of care which the curator and the museum require in selecting material for retention. In addition, the Jones-Miller case study illustrates the pressures that are periodically brought to bear upon the limited holding and examination space within the building, and the additional space needed for housing various materials. These spaces should be located close to laboratory and other specialized facilities so that scientists can pursue their work effectively.

DONATED COLLECTION CASE STUDY

One donated collection is the largest (577) ethnographic collection processed in recent years. Because the great majority of the objects were processed recently (1975-1976), it was possible to construct a detailed account of the procedures used from interviews and the working notes of curators and scientific support staff. Each specimen was examined by the appropriate curator with the result that about 65% of the original gift was accessioned into the permanent collections. Of the remaining 35% slightly under 3% were transferred to other, more appropriate, Smithsonian museums. Another 31% consisted of ethnographic materials which did not enhance existing holdings within Anthropology. These were placed in the School Collection, which is a pool of specimens that are made available as permanent loans to educational institutions. The School Collection is held in tightly packed temporary storage. Finally, under 1% of the collection consisted of substantially altered ethnographic materials. These were given to the Conservation Laboratory, where they will be used as a source of supply for materials needed in restoring specimens in the permanent collections and in testing new conservation techniques.

INVENTORY AND DEACCESSIONING

The Department of Anthropology has placed catalogue data associated with its holdings in a computer data file because automatic data processing (ADP) offers a technology for handling long-standing control problems in its collections. The culling and upgrading study built upon established departmental

practice and developed a procedure for ADP assisted inventory of the permanent collections. To test the new procedures several pilot inventories were conducted. The primary purpose of the physical inventory is to maintain and upgrade the scientific quality of the collections. This is accomplished by establishing greater control over the location, documentation, and physical state of the specimens. In addition, physical inventory is an aid in locating and identifying specimens that should be recommended for deaccessioning.

The pilot inventories suggest that the number of deaccessioning recommendations can be expected to be small (less than 1%). The departmental Collections Advisory Committee has handled correspondingly few deaccessions (4% of its transactions). It is clear, therefore, that careful implementation of the departmental Collections Policy in considering potential accessions remains the most effective means of limiting and guiding collections growth.

APPENDIX D

Information Management

The significance of a museum object lies both in the object itself and in the information pertaining to it. Consequently the recording of information about collection contents should receive as high a priority as collecting itself.

A few decades ago any discussion of how museums collect such knowledge might have been limited to a description of museum record keeping methods. But the development of computers has focused attention on information as a discrete resource and even as a commodity. As a result, the museum profession, like many others, has been led to consider records management in the broader context of information management.

Although computerized systems have been widely publicized in recent years, the principles on which automated information systems are based were established before computers became available and are applicable to manual systems as well. These principles reflect a basic shift of emphasis from routine preparation and retention of records to the need for better access to the information contained in them.

This shift in emphasis does not obviate consideration of the records themselves. Therefore, it may be helpful to include here a brief description of what records are maintained in Smithsonian museums and why:

- o Arrival records. Practices and names vary but every museum starts keeping track of objects and specimens as soon as they arrive. At this point it is not always known whether an item will become part of a permanent collection. It may be submitted for identification or examination. It may be offered for sale and submitted on approval. Or it may be an intended donation, solicited or unsolicited.

Such records are usually maintained in the office of a museum registrar before the item is forwarded to the appropriate department or curator for disposition. Usually each item or group is assigned a temporary identification number, often referred to as a registration number or registrar's number. The record may be kept on cards or in log books and supplementary files may be developed to assemble correspondence or other documentation.

- o Accession records. At the Smithsonian as well as in most museums, an object or specimen is never regarded as being in the collection until it has been accessioned. Accessioning is a formal process executed only after a thorough analysis has taken place. Analysis, which is primarily a curatorial responsibility, includes such things as determining the appropriateness of an item to the collection, evaluating its quality and preservability, ascertaining its provenance, making sure the offerer has a legal right to convey it, documenting the instruments of conveyance, etc. When all this has been accomplished an accession number is assigned and all the pertinent documents are assembled in a single file folder or envelope. Almost invariably the assignment of accession records and the maintenance of the files is a registrarial responsibility. If any accession documentation is maintained by the curator it usually consists of duplicates of selected documents. Hence for any action related to inventory the first place to start is the museum registrar's office.
- o Donor records. The term donor is a typical designation encompassing sellers and bequestors as well as donors. At the Smithsonian it is customary for each museum registrar to maintain a "donor" file and to compile an annual report of the receipts from each donor. In general a registrar has only two points of access to records --- donor name and accession number.

- o Cataloguing records. Cataloguing in a museum is much the same as it is in a library. If a traditional card catalogue is maintained, each object is represented by a master card giving many of the particulars about the source, significance and nature of the object and sometimes indicating its current location. Additional copies of the card, or cross-references to it, may be prepared to provide access to the information by type, material, name, or other characteristics of the object. Usually the object is given a catalog number different from the accession number.

Just who does the cataloguing depends to some extent on the nature of the museum. In an art museum it is apt to start with the registrar. In other types of museums it is apt to be a curator or some trained person working under the guidance of a curator. In any event it is generally considered necessary for a cataloguer to have special knowledge or expertise in the discipline of the collection.

- o Loan records. In rare instances (e.g., at Freer) museums are prohibited from borrowing and lending. Otherwise, at any one time a museum can be expected to have a number of its own objects out on loan to other institutions and a number of other institutions' objects temporarily on loan to its own quarters. It is usually the registrar who handles all the packing, shipping, receiving, insurance, customs and similar matters on both incoming and outgoing loans. And it is the registrar's office that usually maintains the records.

The manual systems still in operation at the Smithsonian have served reasonably well through the years but some of them are gradually being replaced or supplemented by automated systems. Although librarians and museum curators in general are sometimes criticized either for reluctance to accept automation or for the inclination to accept packaged systems without thorough preliminary evaluations, neither extreme is in evidence at the Institution.

A typical example of a new look at an old manual system that has served reasonably well in the past is the current investigation at NMNH into the possible automation of its donor records. It has always been the custom of

the museum to maintain a 3x5 card file in donor-name sequence. (The practice began in the old U.S. National Museum, where donor name was the access point most frequently needed by registrarial personnel.) Cards for each current year are filed separately. Before being interfiled in the main file they are used to compile an annual report giving particulars on the year's acquisitions. Preparation of the annual donor report is a time costly clerical project. This year the museum's registrar is undertaking an analysis of the comparative cost of maintaining a computerized donor file. The investigation is still under way but it appears that the effort required to key a new computer record would be virtually the same as that required to type a card. However it further appears that the combined costs of maintaining the file and printing out an annual donor report from it may be slightly less than the overtime costs involved in preparing a manual report. A computerized file would offer the added advantage of printing out lists sorted on other useful access points, such as collection assignment, accession number and departmental location. If the plan is adopted the museum's registrar proposes to initiate the computer file at the beginning of the next fiscal year and incorporate records for previous donations on a time-available basis, spreading the effort over several years until the entire file has been computerized.

This investigation is one of many that have led to the successful introduction of automation in a number of Smithsonian museums during the past ten years. The usual practice is to identify some objectives that are not being met successfully, or not being met at all, and to design an automated procedure capable of supporting them. Nearly all of the systems developed to date have been adaptations of SELGEM, a general-purpose system devised by the Office of Computer Services in 1966. Two years ago the SI Registrar's Office compiled

a list of information needs that might be filled by automated systems. The following have been extracted from that list:

- o Locate all the works by a particular artist.
- o List all the objects (in each museum) made of the same basic materials such as glass, silver, wood, etc.
- o List all the items obtained from a particular donor (seller, bequestor).
- o List all the specimens collected at a particular site or in a particular geographic area.
- o Prepare location lists for inventory purposes.
- o List all the items currently on loan to a particular borrower.
- o List all the items currently on loan from a particular lender.
- o Search the records for all the items meeting some particular set of criteria (combination of object type, material of fabrication, source, etc.)
- o Identify candidate objects for an exhibit on a particular theme.
- o Prepare exhibition catalogs.
- o Identify all the artifacts related to some important person or event of historical significance.
- o Locate the portraits of a particular individual.
- o Prepare exhibit labels for objects and specimens.
- o Find weak spots or holes in collections by preparing lists according to taxonomic, geographic or other characteristics.

Some of these purposes can be seen reflected in accounts of automation activities in various Smithsonian bureaus. A few illustrative examples appear below.

The HMSG collection is comprised of 6400 objects, consisting primarily of late-nineteenth and twentieth century paintings, sculptures, drawings and prints. Basic catalogue information on each object has been entered in the computer files. A master listing of this information has been produced and is to be updated every six months. In addition, listings by accession number, cross reference from several previous accession numbering systems, storage inventory cards, photo archives file labels, frequency data by artist and object class, and listing of specific parts of the collection (e.g., "nineteenth century American sculpture") have been generated.

Preliminary steps have been taken for an inventory of the entire NASM collection. The NASM staff is working in close conjunction with OCS to devise forms which will facilitate the indexing of the collection on the computer. Meanwhile, the following systems are in operation:

- o Aircraft. A compilation of aircraft in museums, worldwide, is maintained. The compilation is on punched cards and tape and is updated biennially for publication as "Aircraft in Museums around the World." This publication is distributed to all contributors and other interested organizations.
- o Aircraft engines. A similar compilation of aircraft engines is maintained on both punched cards and tape. "Aircraft Engines in Museums around the World" was published once and is being updated for republication.
- o Aircraft models. NASM maintains an inventory of its model collection on punched cards and tape. It is for internal use and no publication is contemplated.
- o Aeronautics Archives Index. A complete index of the Aeronautics Department archival material is on computer tape. Printouts are provided to the Department and to the NASM Library. The index has just been updated and will be updated every 6 months. The NASM aircraft drawing collection which is being microfilmed is being added to the index.

Computer files representing over three million specimens had been compiled at NMNH by the end of 1976. All files are in the format of the SELGEM system, which permits data to be retrieved and reported in a wide variety of ways. Each file conforms to a specific set of data standards which state the accuracy, thoroughness, format and syntax of the data. As far as is practical, the same data standards are followed by several files so that information can be retrieved from them simultaneously without prior modification of the data. Information from files is provided by the ADP Program Office upon request and with the approval of the appropriate sponsoring department. Outside recipients of information are billed for services on a cost basis unless other arrangements have been made. Internal requests are covered by internal budgets.

The subject matter and objectives of computer files built for collection management purposes are set by each scientific department in NMNH according to its needs. Other data banks relating to specimens are built by individual scientists for special purposes. Four kinds of files are recognized:

- o Catalogue files. These contain individual specimen records made up of all the data typically included in specimen catalogues and found on specimen labels. The data generally include catalogue number, accession number, dates of collection, names of collectors, donors, and cataloguers, name of the specimens, complete information about the collecting locality, bibliographic information if the specimen has been mentioned in the literature, specimen count, sex if applicable, basic measurements when appropriate, stratigraphic information for geological specimens, cultural information for anthropological specimens, status of the specimens as types, and pertinent remarks.

Catalogue files may be either current or retrospective. Current catalogue files are generally built during the process of cataloguing specimens, and thus contain information on specimens which have been catalogued since the ADP procedures were implemented. Retrospective catalogue files cover specimens catalogued prior to the change to ADP methods, and are generally built to complete the computer record of some unit of the collection. Retrospective treatment of collections provides the opportunity to systematically review and verify the contents of the collection.

- o Collection-index files. These contain only part of the data available for the specimens covered. Hence complete collection coverage can be achieved more rapidly and more cheaply than with catalogue files. Index files are generally built when the department has a short-term objective involving an entire collection, but does not have the resources to complete a catalogue file. Examples are the Ethnology collection and the collection of Reptiles and Amphibians from the U.S., for which index files are being built to aid inventory reviews and to provide basic cross-indexes. Only key data needed to meet the objectives of the project are included in index files. Index files generally cover both old and new specimens, and may include specimens which have not been catalogued.
- o Research files. Included here are files which contain specimen information and which are either built or supplemented as part of the research objectives of individual scientists. In some cases the scientists simply add to the specimen information already entered in a catalogue or index file. In other cases the scientists are building the complete files themselves, using their own resources. The Carabid Beetle collection in the Department of Entomology is an example of the latter case.
- o Reference files. These usually do not refer to specific specimens but contain information which may be useful in dealing with the collections. For instance, several bibliographic files are being constructed which include publications that discuss specimens held in the collections. Also, several files provide complete taxonomic syntheses for some major groups such as bees and wasps, and plants. Reference files are generally built for purposes other than aiding the use of the collections, and do not draw on resources set aside for computerizing the collections.

APPENDIX E

Conservation

Throughout this report heavy emphasis has been given to the conservation functions of museums. This appendix describes more fully the role of the conservator, the need for conservation facilities, and outlines some of the major functions of the conservation laboratories of the Institution.

Objects do not persist unchanged merely as a result of becoming accessioned into a collection. In fact they are subjected to greater risk of damage because they become a cynosure for scholars, curators, cataloguers, exhibitors, and the public. Conservation is the activity which aims at mitigating these risks. It is a complex operation. Its parts are: control of environment, examination, preservation, and restoration of individual objects. Examination preparatory to preservative treatment can, if done in-depth, also yield information of scholarly value to the art-historian, the archaeologist, or other type of curator. When emphasis is given to examination whose outcome is not necessarily subsequent preservation, we have what is known as "Archaeometry."

If properly documented, conservation activities also add to our knowledge of deterioration processes and lead to research into new techniques for increasing longevity.

Conservation activity cannot be compartmentalized. It operates at numerous levels, involving: a) registrars, who keep condition reports and ascertain that fragile objects are not lent, travel unnecessarily or travel without environmental control when they need it; b) security staff, who prevent vandalism; c) building managers, whose engineers maintain steady relative humidity and temperature and dust-free air, unfailingly, and who prevent insect infestation; d) designers, whose display techniques protect the object from excessive light, contact, polluted air, and the corrosion stimulants generated by wood and by some modern paints; e) curators, who have the administrative power to insure that objects are not damaged by mishandling; f) curatorial aids who constantly monitor storage areas, noticing changes in objects which need attention; g) a conservation laboratory where examination in depth, information on preservation, and treatment aimed at simple cleaning or physical/chemical stabilization or even restoration can be provided, in accordance with the code of ethics of the American Institute for Conservation.

The conservation laboratories of the Institution's museums are staffed by professional conservators with secretarial and other assistance. Ideally, from a beginning in art-history, anthropology, or archaeology, in chemistry or other science, and possessing manual aptitude, the professional has been trained in a conservation school to the Master's level. In actual fact, as a result of a world-wide shortage of such graduates, individuals without these qualifications and lacking some of the requisites for them, do fill many Institutional positions and can perform admirably because of the cooperation they obtain from curators and scientists.

Most of the museums (Freer, HMSG, NCFA, NPG, NMNH [Anthropology], NMHT, Cooper-Hewitt) employ conservation staffs. These can assist registrarial and curatorial personnel in reporting conditions and in making regular inspections of exhibit halls and storage areas for evidence of damage or deterioration. In addition, NMHT has made good use of "Conservation Coordinators" who, during the preparation of an exhibition, work with display-contractors, curators, designers, in consultation with the Conservation-Analytical Laboratory in order to catch mistaken procedures or unsuitable materials before they are incorporated on a large scale with consequent risk to the objects, and to provide for the smooth and adequately scheduled flow of objects needing treatment. Such coordinators can greatly increase the output of the limited number of conservators engaged in the actual treatment of objects. There are too few conservators to perform all the treatment required. Hence they should be supported fully, and their time not diverted to activities which can be performed as well by lesser trained personnel.

Conservators also need support from scientist-analysts who can examine objects in a penetrating manner, identify products of deterioration, determine the suitability of materials for specific functions, etc. Scientists are essential for Archaeometry. Such scientists are employed at the Freer for work on their own collections, and a small group is available to all of the Institution through the Conservation-Analytical Laboratory.

A further activity of the conservation staff is training. A limited number of interns are accepted into the various laboratories, from time to time, as work-loads permit. Usually these come from one of the conservation schools.

The Anthropology Conservation Laboratory of NMNH, in an attempt to assist in filling a nation-wide need for anthropology technicians, has offered learning opportunities to students from the George Washington University Museology program who learn as they work. Only about one third of the operators in that laboratory are employed by the Institution.

Conservation Facilities and Personnel

In 1963 the Institution established the Conservation Analytical Laboratory, a central unit designed to assist all SI museums. Staffed by conservators and scientists, CAL advises on the suitability of environmental conditions, examines and treats objects needing protection or preservation, analyzes objects to obtain research data of interest to historians and scientists, and provides data for training programs in conservation techniques. Objects or specimens that present special problems or require specialized equipment not available in curatorial units can be treated in this central laboratory. Some idea of the scope of conservation activity is provided by the following list of typical CAL functions:

- o Analyses of objects or materials (e.g., pigments, fibers, alloys, corrosion products) by advanced instrumentation to determine appropriate conservation procedures.
- o Analyses of objects or materials to provide museum archeologists and historians with basic research data on dates, attribution, ancient production methods, etc.
- o Tests to determine the suitability of commercial products proposed for prolonged contact with artifacts or for use as fumigants in storage.
- o Cleaning, mending, alteration and restoration of objects.

- o Devising of nondestructive analytical methods suitable to museum objects and specimens.
- o Provision of information on request, and of training aids including lectures, video-tapes and tape-slide lectures.

Interviews with curators and conservators in the various bureaus suggest that, in spite of all this attention, conservation activity throughout the Institution is not as effective as it might be. Not unexpectedly the problems most commonly cited were insufficient staffing and insufficient time. Respondents cited cases where problems had remained undetected for such long periods of time that complete restoration of the items was difficult or impossible. Some of those having responsibility for regular conservation inspections admitted that scheduled inspections often had to be postponed and that objects stored in certain locations sometimes had remained uninspected for excessive periods.

Attempts to quantify personnel and time shortages brought inconclusive results during these interviews. The Institution, which has 44 people devoted to conservation on a full-time basis out of more than 2000 people having direct collections management responsibility, was compared with the British Museum, which has 63 out of approximately 1100. However, there was no information on which to base an overall comparison of the two institutions. While it has been said, as a rule of thumb, that one full-time conservation employee is needed for every 250,000 objects, this rule also could not be confirmed satisfactorily. If applied to the Institution's more than 70 million objects, the number of conservators would have to increase from 44 to 312, an increase that would be difficult to justify and which would be virtually impossible to achieve in the foreseeable future due to the internationally acute shortage of

trained personnel. (For example, assigning 49 conservation employees to the present stamp collections might produce results other than those intended).

There seems to be little doubt that conservation efficacy should be made the subject of a management survey at the Smithsonian in an effort to determine just what the problems are and how best they might be attacked. Meanwhile, for the purposes of this study it should be observed that space and suitable personnel sufficient to implement an effective conservation program must be regarded as essential operational requirements for the proposed Museum Support Center.

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